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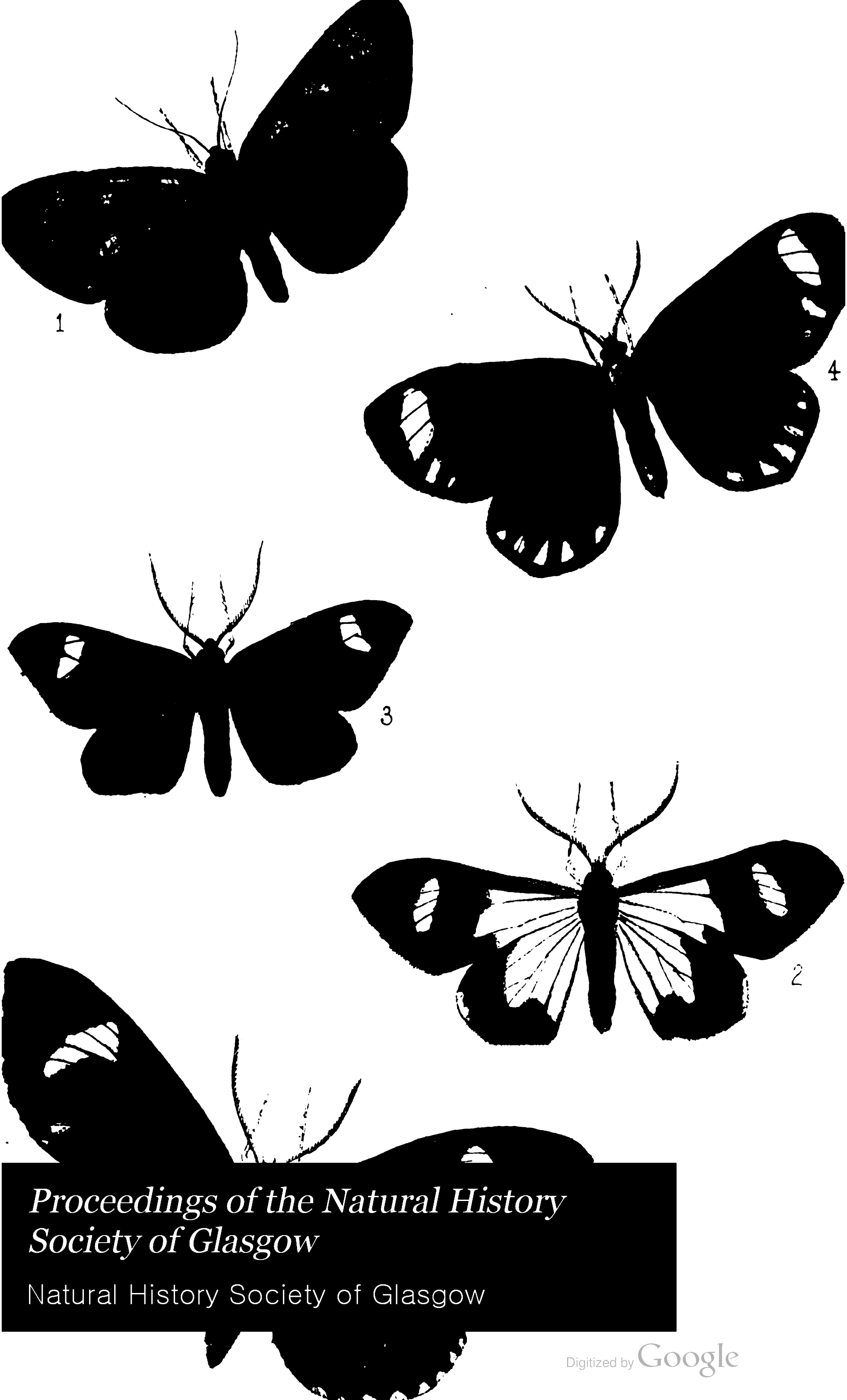

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1869

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OF THE

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OF GLASGOW

VOL. I.—PART II.

GLASGOW: PUBLISHED BY THE SOCIETY
AT THEIR ROOMS IN ANDERSON'S UNIVERSITY BUILDINGS
1869

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SESSION 1868-69.

THE SEVENTEENTH ANNUAL GENERAL MEETING, ANDERSON'S UNIVERSITY BUILDINGS, SEPT. 29TH, 1868.

Professor John Young in the chair. The following gentlemen were elected office-bearers for the ensuing session:—Hugh Colquhoun, M.D., President; Professor John Young, David Robertson, Vice-Presidents; Robert Gray, Secretary; Thomas S. Hutcheson, Treasurer; James A. Mahony, Librarian. James Stirton, M.D.; John Grieve, M.D.; Thomas Chapman, Edward R. Alston, William Euing, Walter Galt, George Thomson, W. N. MacCartney, Members of Council.

PAPER READ.

On the Present Character of Zoological Research.

By Professor JOHN YOUNG, M.D.

In this address, Dr Young explained the doctrine of Evolution as at present understood, and the mode in which development and genealogical succession are treated as synonymous.

OCTOBER 27TH, 1868.

Professor John Young, Vice-President, in the chair. Professor Alexander Dickson, Glasgow University, and Mr Henry Dunbar, were elected resident members.

SPECIMENS EXHIBITED.

The Secretary exhibited a specimen of *Leptæna Youngiana*, of Davidson—a new Silurian brachiopod shell from the Girvan district. Three examples of this undescribed species had been collected during the past summer by Mrs Robert Gray, and submitted to Mr Davidson, of Brighton, who named it after Mr John Young, in consideration of the valuable aid received from him during his researches among the *Palæozoic Brachiopoda*. *Leptæna Youngiana* is distinguished from others of the same genus by the transverse rugose ridges on the ventral valve, which is regularly convex, with an incurved beak. The dorsal valve is deeply concave, following closely the curvature of the opposite valve, giving the shell very much the appearance of a productus.

Mr Gray likewise exhibited a slab of Silurian shale, containing numerous specimens of *Entomostraca*, belonging to the genus *Leperditia*, and remarked that, so far as he was aware, it was the first example of *Entomostraca* having been found in the Girvan district—none, at least, having occurred during the last seven or eight years of constant observation in that particular field. The slab was taken from the mass at Aldons Quarry, about seven miles south of Girvan. The species of *Leperditia* had not yet been determined.

Professor Young exhibited some specimens of Moa bones recently presented, by Mr Wilkie Morris, to the Hunterian Museum, on which he offered a few remarks.

Mr J. Gilmour exhibited a very unusual specimen of the black grouse (*Tetrao tetrix*), which he described as a female (the grey hen) assuming the plumage of the male. The head and neck were exactly those of a grey hen, the rest of the plumage resembling that of a young male, the lateral tail feathers showing a tendency to curve outwards. Mr Gilmour mentioned that the bird was proved to be a female on dissection.

Mr William Lorrain exhibited a specimen of the rose-coloured pastor (*Pastor roseus*)—a male of the second year—which was shot on the farm of Hundred Acres, near Glasgow, on the 7th of August last. It had been seen previously associating with a troop of common starlings. Mr Lorrain also exhibited a specimen of the Great Spotted Woodpecker (*Picus major*) which had been shot at Ardgowan, near Inverkip, about the 17th of the present month. The species but rarely occurs in the west of Scotland; but in the eastern counties it appears to have become a regular winter visitant for some years past, making its appearance occasionally in very large flocks. Many hundreds had this year been seen in Orkney and Shetland, and larger flights than usual appear to have visited various districts of the north of Scotland.

Mr J. A. Mahony exhibited an undescribed variety of *Laminaria digitata* from county Galway. It presented no apparent structural difference from the true *Laminaria digitata*, but had the peculiarity of producing mannite on the surface of the frond after being exposed for a few days, while the normal form bears an efflorescence of saline compounds, chiefly salts of potash and soda. Besides, while the frond only of the latter is annual, and cast off every spring, this variety becomes detached a short way down the stem, and thus the whole frond, with part of the stem attached, is thrown on shore in May when the plant is ripe. Mr Mahony also exhibited illustrative specimens of *L. digitata* and the variety *stenophylla.*

PAPERS READ.

I.—*Notes on a Botanical Tour, with Mr W. Galt, to Ben Lawers.* By Dr JAMES STIRTON.

In the course of his remarks, Dr Stirton exhibited a collection of rare mosses, chiefly of the genus Hypnum, ten of which had hitherto been found in this country only on Ben Lawers. Among these were two species new to Britain—*Brachythecium Starkii* and *Hypnum Bambergeri*—the latter having been found in 1867, in the same locality, by Dr Fraser, Wolverhampton, and one new to science—*Plagiothecium annotinum.* Besides these, *Hypnum imponens,* new to Scotland, was also found.

II.—*Notes on Dytiscus Lapponicus (Gyllenhal) collected in Ireland during the present Autumn.* By Mr JAMES E. SOMERVILLE, B.D.

All who, with naturalist's eye, have stooped and peered into marsh or quarry hole, ditch or pool, must be familiar with the large water beetle *Dytiscus marginalis;* for though in Scotland he is less abundant than in the southern portion of the island, yet he is plentiful enough to have found a place, for a time at least, in all our fresh water aquaria. And surely none can there have observed the graceful lines of his build, the wonderful structure of his patent floats, with their regular and simultaneous action, the curious arrangement of the windsail or ventilating apparatus, the strange anchoring appliances on the fore limbs of the males, without being forced to admire the wisdom and skill of the Architect and Builder of this little living ship, and its remarkable adaptation to the element it is intended to navigate But in spite of all these points of attraction, *D. marginalis* is generally soon expelled the aquarium. The newts succumb to his voracity, and even the minnows find his powerful jaws the plague of their lives.

D. marginalis may be taken as a good type of the genus, of which

Europe possesses nine species, six of which are found in Britain. In nearly all the species the females may be distinguished from the males, by the elytra of the former being deeply sulcated, while those of the males are smooth. Another distinction which characterises the males of *Dytiscus*, and the three allied genera, *Cybister*, *Hydaticus*, and *Acilius*, is the curious patellated form of the anterior tarsi, the three upper joints being expanded into a circular disc, on which are placed a number of suckers by which the creatures are enabled to attach themselves to smooth surfaces.

In Scotland there occurs in our ditches, besides *marginalis*, another species, *punctulatus*, easily recognisable by its deep black hue both above and below, by the three distinct rows of punctures on the elytra, and by the rounded form of the hinder coxae. Scotland possesses yet another species, *Dytiscus Lapponicus*. It was first discovered in 1854 by the Rev. H. Clark, who obtained, with much difficulty, four specimens from a loch in the island of Mull. The species may easily be distinguished from *marginalis*, and indeed from all others, by its diminutive size, by its slender and elongated form, by its yellow scutellum, by the very acute form of the hinder coxae, but chiefly by the great number of faint yellow lines on the elytra, each elytron bearing from eighteen to twenty of these. These lines are not so apparent in the dried specimens, but they are quite remarkable when observed while the creature is under water. They appear as if shining through from the under side of the somewhat transparent wing-cases. Mr Hislop of Polmont, one of our honorary members, was the second to take the insect. He obtained a few specimens also in Mull.

In 1859, while on a tour through the south of the same island, my brother and I took fifteen specimens in a very small tarn, after a long and unsuccessful hunt in many mountain lakes.

Again, in 1866, happening to be at Tobermory, in the north of Mull, I made a careful search of *all* the lakes in the neighbourhood, and that is saying not a little, but was quite unsuccessful. The last night of my stay in the island, I recollected having seen from a considerable distance what appeared to be a small tarn, and which I had not yet searched. Unwilling to give up while any hope remained, I started off, and on reaching the place found a lake different from any I had yet visited. It was situated on the top of a curiously shaped hill, standing somewhat alone. The lake was sunk down deep into the centre of the hill, so that it was possible to see the open country from only one spot. The place reminded me of the Devil's Punch Bowl, or of the crater of Vesuvius, and, indeed, it looked uncommonly like the crater of an extinct volcano. I noticed that no stream seemed to issue from the lake, and further, that there seemed to be no trout in it. In all the other lochs trout abound, which explained the absence of *Hydradephaya*, as trout and *Dytisci* cannot compete. *Dytiscus* must go to the wall, or more correctly to the stomach.

I observed several newts swimming about fearlessly, and very soon a Devil's Coach, as the larva of *Dytiscus* is well named, appeared; and after searching round the edge for a few minutes, I was rewarded with the sight of the insect sought. I immediately made the capture, and commenced a regular hunt, which was stopped only by darkness coming on. I came away with all my collecting bottles full.

This summer (1868) during the month of August, I happened to be in the north of Ireland, in the county Donegal, and in passing through that wild and bleak district, cast occasional glances into some of the innumerable lakes and tarns with which its hill-sides and moors are studded, but with little success. Happening one day to pass a small tarn, pretty high up on the hill-side above the sea, and observing that no stream appeared to issue from it, and that there was no indication of its containing trout, I gave a somewhat careless glance into it. I was not a little astonished to observe, almost on the instant, a *Dytiscus* slowly paddling along. It was immediately recognised as *Lapponicus;* and I have now much pleasure in recording the first capture of the insect in Ireland. Unable to spend much time looking for more specimens that day, I returned the following one. A fearful day of wind and storm it was. There was something rather eerie, I confess, in standing alone on a bleak hill-side in torrents of rain, up to the knees in the loch, the wind hissing along the surface of hill and lake, lifting the water in spray, while the Atlantic roared and thundered on the cliffs below. In spite of the difficulties of the day, I managed, however, to secure a goodly series of specimens.

Let me say a few words now about the habits of the insect. *Dytiscus Lapponicus*, as its name imports, is a truly hyperborean species. It occurs in the lakes of Norway and Sweden, and also in northern Germany. Its occurrence in the north of Scotland was therefore a thing not so improbable; but it is interesting to find this boreal species appearing so far south as the S.W. of Donegal.

D. Lapponicus differs somewhat in its habits from *marginalis* and its congeners. *D. marginalis* seems to prefer marshes and ditches, where there are plenty of water plants; *Lapponicus* chooses rather an open lake or tarn; at least the three times I have met with it, the pieces of water have been almost devoid of vegetation. But while *Lapponicus* dislikes botany, it makes selection as to geology. A soft and muddy bottom does not suit it; it always chooses a lake where there are plenty of *stones*, and it is the observance of this fact which has enabled me to take it pretty freely. Instead of sweeping along the banks of the tarn, or scouring the bottoms of pools with the net, my plan is this:—Going to the shallow and stony end of the lake, and putting myself into the condition of a heron, I carefully turn over the stones, causing as little disturbance as possible, and there beneath the stones, or clinging to them, the insect is found, I have taken as many as four beneath one stone. They seem capable of taking very long breaths, or else of collecting oxygen from the diminutive vegetation which clothes the stones, as I have very seldom observed them coming to the surface to breathe.

I would infer from this habit of lurking beneath stones that *D. Lapponicus* may probably be nocturnal in its habits, as is known to be the case with another water-beetle, *Orechtochilus villosus*, an insect allied to the *Gyrini*.

D. Lapponicus seems to be very local, and, it might almost be added, gregarious; for while it occurred freely in one tarn, I searched several others in the neighbourhood without success. It is also remarkable that in the loch where it was obtained, there were very few, I might say almost no other insects, although in the neighbouring peat-holes *Hydropori*, *Gyrini*, etc., were plentiful.

Another fact which struck me was, that in the lake only *D. Lapponicus* occurred, while a few yards farther up the hill, on putting the net down into a mass of floating water plants, the first haul brought up four or five *Dytiscus marginalis*, which looked quite gigantic beside their lake cousins. There was no *marginalis* in the lake, only *Lapponicus*, and no *Lapponicus* in the peat-hole, only *marginalis*.

I must not omit to notice the remarkable numerical disproportion between the males and females of this species. In regard to *marginalis* and *punctulatus*, so far as my experience goes, the two sexes are about equally numerous. Not so with *Lapponicus*. On the three occasions when I have met with it, the females have been conspicuous by their paucity—the proportion being rather more than five males to every female. I am at a loss to account for this remarkable disproportion.

One theory I would suggest is this:—The males of the genus, as I have observed, are smooth, while the females have the elytra sulcated, each with ten furrows. In *D. Lapponicus*, as noticed, the elytra are beautifully streaked with yellow lines, and when the creature has but recently emerged from the pupa, these markings are particularly distinct. I was much struck, while observing some of the males clinging to the bottom, by the very remarkable resemblance they presented to the leaf of *Potamogeton natans* when dead and half withered. The streaks of the elytra corresponded almost exactly with the veins of the leaf. May not this strange resemblance to the leaf of *Potamogeton*, which was the only plant which attracted my notice in the tarn in Ireland, be the means of preserving the males from the attacks of herons, gulls, and other enemies, while the female, not having the resem blance so strikingly, is without this shield, and so falls a prey more easily?

Should this explanation prove to be correct, *Dytiscus Lapponicus* may be looked upon as an interesting exception to the ordinary course of nature. The general rule is that when there is "imitation" or "mimicry," it is the female more particularly which gets the benefit of the shelter. But in the present case it is the male which obtains the advantage; the other sex being left in the condition of unprotected females.

NOVEMBER 24TH, 1868.

Mr Thomas Chapman in the chair. Messrs William Haddin and James D. Dougall, jun., were elected resident members.

SPECIMENS EXHIBITED.

The Secretary exhibited the following birds which had been obligingly forwarded by William Boyd, Esq., Greenock:—

1. A specimen of the Hawk Owl (*Surnia funerea*), which was taken in the flesh to a Greenock bird-stuffer about ten days ago for preservation, and is supposed to have been captured at no great distance from that town. This is the fourth specimen that has occurred in the mainland of Britain, and the sixth Hawk Owl that has been captured as British, taking into account two specimens recorded by Dr Saxby, of Baltasound, as having been procured in the Shetland Islands.

2. A specimen of the Great Snipe (*Scolopax major*), shot by Mr Boyd on the 15th September last, in the parish of Stewarton, Ayrshire.

3. An unusually dark-coloured specimen of Richardson's Skua (*Lestris Richardsonii*), shot last winter in the Hebrides. This specimen was exactly in the uniform shade of plumage figured in Swainson's "*Fauna Boreali-Americana*," pl. 73.

Dr Dewar exhibited a handsome variety of the Pheasant, apparently a cross between *Phasianus versicolor* and *P. Colchicus*, obtained this month at Skipness, Argyleshire, and stated to the meeting that he had another specimen of this variety in his collection from Culzean grounds, Ayrshire.

Mr J. Coutts exhibited specimens of the common Silk-Worm and its products, from a second brood reared in Glasgow during the present year, on which he made a few remarks.

Mr J. Young exhibited from his own collection ten species of *Goniatites*, and made some observations on this interesting group of extinct, chambered, fossil shells, pointing out their relationship to the extinct family of Ammonites, their distribution in time, the manner of their occurrence, and the various species found in the carboniferous limestone of Scotland.

Mr William Lorrain exhibited a specimen of the Great Grey Shrike, or Butcher Bird (*Lanius excubitor*), from near Lochwinnoch, where it was shot a few days ago when in company with another bird of the same species. In the course of his remarks on this bird, Mr Lorrain stated that it occurs but rarely in the West of Scotland, but was now becoming well known in the eastern counties as a winter visitant, the specimens met with being generally females and young males. Mr Gray had informed him that out of a dozen specimens obtained by himself, only one could be said to be a male in a perfect state of plumage. Mr Lorrain expressed his obligations to Mr M'Culloch, bird preserver, Sauchiehall Street, for the opportunity of submitting the specimen to the meeting.

Mr William Sinclair exhibited a specimen of the Green Sandpiper (*Totanus ochropus*), shot on the 10th November on the banks of the river Cart, near Pollok House, by Mr William Cox, keeper on the estate. The Secretary, in his remarks on this specimen, stated that, so far as he was aware, it was the first instance of the species having occurred on any part of the western mainland or its island dependencies. It had, however, been found in Aberdeenshire by Mr W. C. Angus, one of the society's corresponding members, and was supposed to have bred in that county; also in East Lothian, by Dr W. P. Turnbull; in Caithness-shire, by Dr Sinclair, of Wick; and in Dumfriesshire, by Sir William Jardine and the late Mr Selby. Very little appears to have been recorded of its habits as a British species; and it is only within the last year or two that anything reliable or definite has been ascertained regarding the nidification of the species.

Mr Arthur Sutherland exhibited a variety of the Alder (*Alnus glutinosa*) from Evanton, Ross-shire; also, an aberrant form of *Geum rivale*.

PAPERS READ.

I.—*Short Notes on the Habits of the Parson Bird (Prosthemadera Novæ Seelandiæ), and the Great-Headed Titmouse (Petroica macrocephala).* By Mr Alex. J. Grant, Otago, N.Z., Corresponding Member.

II.—*Notes on some Land and Fresh-Water Shells from Egypt and Palestine*—with illustrative specimens.

By Mr James E. Somerville, B.D.

III.—*Notices of the Recent Occurrence of Rare Birds in Aberdeenshire.*

By Mr W. C. Angus, Corresponding Member.

The principal facts alluded to in this paper were the breeding of the jacksnipe in that county; the occurrence of the honey buzzard (*Pernis apivorus*); little bittern (*Ardea minuta*); and great spotted woodpecker (*Picus major*)—the last named having apparently been seen and obtained in unusual numbers this year.

December 29th, 1868.

Mr Walter Galt in the chair. Messrs James Stewart and William Knox Gilchrist, were elected resident members.

SPECIMENS EXHIBITED.

1. A specimen of *Astrophytum scutatum* from lat. 73 5 N., long. 75 40 W., at depth of 250 fathoms; also a series of varieties of *Valvata multiformis* from Mayence basin, by the Rev. H. W. Crosskey.

2. A specimen of the Cream-coloured Courser (*Cursorius Europœus*), which was shot in a grass field near Lanark by Charles Walker, Esq., of Braxfield House, on the 7th of October last. This is the first record of its occurrence in Scotland. The species is extremely rare in the British Islands, and is but seldom met with in any part of Europe.

3. A specimen of the Osprey (*Pandion haliaëtus*), shot near Larbert in October last, and forwarded by J. A. Harvie Brown, Esq., corresponding member.

4. A series of specimens of *Bryum cirrhatum* from Ben Lawers, a species new to Britain, by Dr James Stirton, who made some remarks on the variations of inflorescence on this and allied species.

January 26th, 1869.

Professor John Young in the chair.

SPECIMENS EXHIBITED.

The Secretary exhibited a series of post-tertiary shells from a clay bed in Inch Lonaig, Loch Lomond, forwarded by Alexander Macniven, Esq., corresponding member. The series included specimens of *Astarte sulcata*, *Balanus porcatus*, *Cyprina Islandica*, *Natica affinis*, *Pecten Islandica*, etc., besides spines of *Echini*, flints, etc.

Mr David Robertson exhibted a number of specimens of the gemmeous dragonet (*Callionymus lyra*), from the shores of Cumbrae, and remarked that about three years ago a friend of his had taken nearly two dozen specimens of this uncommon fish in one day. Mr Robertson also exhibited a specimen of the black-mouthed dog-fish (*Squalus melastoma*), a rare species, taken by one of the Cumbrae fishermen on their usual fishing ground in the Firth of Clyde. In adverting to the various uncommon and important objects that have already been recorded from the Firth of Clyde, Mr Robertson advocated, as a means of increasing our knowledge of marine animals, the formation of branch societies in seaport towns, where the labours of seafaring persons could be made advantageous to science. By giving fishermen and others a personal interest in their discoveries through membership, the results, he argued, would tend to stimulate them to industry, and have a more elevating effect than the mere reward of an occasional shilling, besides securing for scientific purposes many valuable objects that are too often thrown back into the sea as worthless.

Professor Young exhibited an unusual dental malformation of the common hare, on which he made some remarks.

Mr Gray, the Secretary, exhibited a specimen of the Velvet Scoter (*Oidemia fusca*), which had recently been shot on the Gareloch, and made some remarks on the distribution of the species in Scotland. Although a common bird on the eastern shores, it is comparatively rare in the west. Its food consisted solely of shell-fish, and for the most part these were bivalves. In the specimens he had dissected he had found large quantities of a species of *Donax* with a very thick shell, which, however, was generally broken into small pieces. Mr Gray also drew the attention of the meeting to a pair of handsome Goosanders (*Mergus merganser*) which had been sent for exhibition along with the Scoter by Mr M'Culloch, taxidermist, Sauchiehall Street. These were both from Argyleshire. Although the fact of the Goosander breeding in Scotland has lately been called in question, sufficient evidence was laid before the meeting to show that in the Outer Hebrides at least it had been taken during the nesting season on several occasions.

Mr John Young made some remarks upon a specimen of *Poterioceras*—a large chambered cephalopod shell belonging to the *Orthoceras* group. This gigantic shell, which appears to be one of the largest examples of the genus yet recorded, was found in the carboniferous limestone at Dunswood, Cumbernauld, and presented to the Hunterian Museum by Thomas Clement Waddell, Esq. The specimen, imperfect at both ends, measures 21 inches in length by 11 in breadth, but when perfect would measure 3 feet. It possesses a large-beaded siphuncle, which measures 2⅝ inches in diameter, and is composed of radiating plates. From the broadly curved wave of the septa, and their distance from one another, it is concluded that this large shell belongs to an undescribed species.

Mr Young also exhibited specimens of a beautiful and rare land shell—*Azeca tridens*—found among moss in the woods at Bridge of Allan last autumn by Mr Foulis, student of Glasgow University. The occurrence of this shell in Scotland has been doubted, although the late Dr Fleming, of Edinburgh, states that it was found a great many years ago by Captain Laskey, at Carline Park, near Leith. Mr Young stated that so far as he was aware no further notice of its occurrence in Scotland had been recorded until Mr Foulis' discovery of this new locality, where it appears to be not uncommon.*

Dr James Stirton exhibited a series of mosses collected by Dr Alexander M'Hattie (lately of this city), illustrative of the close affinities of the lower forms of vegetation on both sides of the Northern Atlantic, between the parallels of latitude 50°—60°.

PAPERS READ.

I.—*Notes on the Herring.* By Mr DAVID ROBERTSON.

The capricious movements and behaviour of the herring have long been a puzzle both to fishermen and philosophers, and may so remain for a long time to come. The most common of these freaks are the occasional appearance of the herring at, and desertion of, particular shores. These, however, do not bear directly on the few remarks that I am going to make, and I may therefore refer only to one or two cases, which embody the chief characteristics of a long list of peculiarities. There is so much told by the fishermen of the marvellous habits of the herring, that in the absence of well-authenticated facts, it is difficult to know what to believe or what to doubt.

The following is a quotation from Mr Mitchell's well-known work on the herring:—

"From 1690 to 1709 a very extensive fishery was carried on at Cromarty, whither the herrings annually resorted in considerable abundance. Shortly after the Union, 1707, an immense shoal was thrown, or rather ran themselves, ashore in a little bay to the east of the town. The beach was covered with them to the depth of several feet, and salt and casks failed the packers. The residue was carried away for manure by the farmers in the neighbourhood. Strange to say, however, they again left the frith in a single night, and no shoals again made their appearance for more than half a century."

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* Mr Foulis has this summer revisited the station, and found the shell in such abundance, that in a patch of moss, not more than three or four feet in length, he succeeded in obtaining upwards of 300 examples, which fact confirms former statements as to its gregarious and comparatively local distribution.

Again, at "Loch Boag, a considerable arm of the sea in Lewis Island; before the middle of the eighteenth century, this loch was well known for its herring, they being considered of good quality. About 1750 the herring left it, and seem not to have returned till about 1790, when for a series of years thereafter there was a very regular fishing during the months of November, December, and January. In 1797 the herrings discontinued their visits; but after the lapse of thirty-two years they returned in the autumn of 1829 in considerable quantities, and in late years the fishing has been frequently abundant." (*Stat. Account of Scotland*, vol. xix., p. 252; *Phil. Journal*, No. 15, 1830.)

This season, on the evening of the 26th of June, I went out with a party to fish herring with a line in the bay of Crinan. Our boat might only be about fifteen or sixteen feet keel; one of the party rowed the boat, while four fished with one line each. The tackle is constructed by having a thick wire, about two feet long, with a piece of lead at the lower end to sink it in the water, and an eye on the upper end to attach the line to, with two wires or pieces of whalebone a foot or so long, fastened by the middle across each other to the upright wire, from which they stand out in four rays at right angles, and other two tiers are repeated in the same way, one above the other about eight inches apart. From each end of the cross wires or rays, a short line with a hook is attached, which comes a little short of the tier next to it, but on the hooks neither bait nor fly is placed—it is more a kind of grappling apparatus than line-fishing gear. This is let down over the side of the boat where herring are expected to be, and, at various depths, is jerked up and down, and if it gets among a shoal of herring, they appear to be readily caught on the hooks, sometimes by one part and sometimes by another. Occasionally the hooks come up nearly or wholly filled; at other times with one, two, three, or four, and so on; always when there is most on, they are soonest on, and then the sport becomes "fast and furious." In the hurry to get off the fish the hooks are often roughly handled, and not unfrequently broken, and sometimes the tackle is again heaved overboard before it is entirely cleared of the fish that are upon it, while some of the lines are bare of hooks altogether before time is spared to replace them. This arises from the uncertainty of the movements of the herring. They may be got for a few minutes as fast as they can be taken, and immediately afterwards not one is felt; hence the eagerness to "make hay while the sun shines."

This mode of fishing is advantageous when a few boats are out at the same time. They are less liable to lose the shoal, because when one boat is seen taking fish plentifully, other boats not having the same fortune gather near to it, and by this means they are enabled to track and keep longer on the shoal. The take was expected to last only during twilight. We were on the station from half-past eight till near eleven. The fish were met with plentifully from nine till a little past ten, and at various depths, from near the surface to seven or eight fathoms. Our take was within three or four of three hundred. But the part that bears most on our subject is the result of two boats trawling in the bay at the same time. Although all the boats that were fishing with the lines were successful, and there might be about a dozen, the trawlers had but a few over three hundred between them. The fishermen ruefully expressed their inability to understand it, as the herring were round them in great abundance.

Captain Kerr, who had been long connected with the herring fishery, related to me the following singular trait in the habits of that fish, which seems to bear in some degree on the above case:—On one occasion, when the net was hanging perpendicularly down, a large shoal of herring came within a few inches of it, but not one *struck*—that is, in the fisherman's phrase, not one came in contact with the net, all remaining for a time stationary a few inches from it; and so straight and regular was the wall of herring noses, as far as could be seen down, that it could have been fancied that each was kept in its place by some unseen agency.

That different shoals of herring frequent the same ground at different seasons, we may, I think, reasonably infer from the following statement by Mr Mitchell. In criticising some remarks of Professor Valenciennes of Paris, he says:—"It is true that the herring fished in winter or the end or beginning of the year on the coast of Norway are very large in size, and that some are 13½ inches in length, but in summer large shoals of another description of herring, not young herring, but with milt and roe, approach the Norwegian coasts, and are fished in considerable quantities." Again, quoting Billing's expedition to the northern regions, he says:—"The herring appear in great shoals in the bay of Avatska towards the latter end of April, and remain till the beginning of June. They seem to come in shoals in both spring and autumn, there being a considerable difference in size, the spring herring being much the largest."

That different shoals of herring, in different conditions, frequent the same ground about the same time, appears most likely.

I am told that herring are generally fattest on a particular coast, at a particular season of the year, but that does not hold good with all the herring met with on that coast; some may be taken at one time moderately poor, and in a few days afterwards a batch may be met with loaded with fat. These facts are so far borne out by the following observations made by myself this season. On the 5th of November I had thirty herrings examined, and found them all in similar condition, moderately fat; again, on the 8th of the same month 60 more were examined from another take in the same district, and all were found exceedingly fat. We cannot well suppose that this difference of condition took place in the few days interval between the dates on which the fish were caught; the difference may be accounted for with greater probability by ascribing it to a separate shoal of herring. From this and the following reasons we may further infer, as a somewhat likely thing, that herrings endeavour to preserve their clanship.

As regards herring caught in the same draught, if *any* of them contain food, in general they *all* contain it, and that very frequently of the same kind, whether it be large or small, a mess of entomostracans, shrimps or fish, thus indicating that they have been coursing over the same hunting-ground together. So far as I can learn, or have personally observed, herring of the same take in most cases are nearly in the same condition; from which we may suppose that they have been sojourning for some considerable time together, under similar or identical circumstances.

As to spawning, the prevailing opinion appears to be, that the herring of the same coast all go to spawn at the same time, and as soon as that office is performed they proceed to deeper water. That this is true to some extent is most likely, but that it is subject to considerable modification, I think must be admitted by every one who has given the subject any attention.

In the months of November and December, herring with milt and roe are met with in many different stages of development; these herring must therefore necessarily deposit their spawn at times different from each other. Under these circumstances, it is not unlikely that male and female herring draught off to spawn as they arrive at the proper period. What may have given rise to the belief that the herring leave for deep water immediately after spawning is, that they often all disappear in a single night; but fishermen with whom I have conversed on that subject affirm, that spent and full herring are taken frequently together, which shows that they do not always leave when they spawn, and suggests the probability that many may wait for some time after, to collect before finally leaving *en masse.*

Near the close of last session (May 26th) I made some remarks on the movements of a shoal of herring in Millport Bay; at the time, I had only seen the herring at the surface where entomostraca (*Cetochilus septentrionalis*) were in patches in excessive abundance, and although the herring were to all appearance in the act of pursuing and devouring the small animals, I had no direct proof on that occasion that they were doing so.

A week or so afterwards, I had a note from Mr James Macalester, one of our members, saying that he had examined the contents of the stomach of some herring, and found them all greatly distended with entomostraca of the same appearance as those which I had exhibited. A little later in the season I had some opportunities of extending my observations on the same subject.

At Tarbert, about the middle of June, I found the stomachs of the herring generally packed with entomostraca, and nothing else. The herring in this condition are called "*gut-poke*" herring It is said that these herring do not cure well, and are wanting in flavour, and that they often begin to decompose in a few hours after they are taken. It has been stated that those caught early in the evening are sometimes nearly useless when they are taken on shore in the morning, owing to the belly of the fish becoming soft, and falling open. This appears to arise from the rapid decomposition of the small entomostracans contained in the stomach. The process begun speedily extends to the adjacent integuments.

I saw hundreds of herring left on the pier, or thrown into the sea at Tarbert, that had been taken the night before, but from softening and rupturing they had become so mutilated in appearance that they were considered unfit to be sent to market, not on account of the bad condition of these rejected fish themselves, but for the unsound appearance they gave to the cargo.

Some of the fishermen and curers are strongly inclined to believe that the "gut-poke" herring is a distinct variety, which continually feed on such fare, and to prove this they say that these herring sometimes leave suddenly, and are succeeded by herring of a better quality. Be that as it may, they seem all to agree that the herring generally are in this state throughout that district, from about the beginning of March till about the beginning of July, and from that time, as the season advanced, the stomach of the herring got less and less full, and the fish more and more fat till about August and September, when it was rare to find a herring with food of any kind in its stomach, that organ, in most cases, having become contracted into a very small gut-like sac. Yet in August and September I have met with herring at times having their stomachs greatly distended with food; but in these months the food consists generally of larger animals, such as small fish, or members of the shrimp family. All that I found so crammed with food neither contained roe nor milt.

In August, 1867, I had a few herrings opened which were taken off the Cumbraes, and I found their stomachs all exclusively packed with the rare stomapod (*Thysanopoda Couchii*). It is the specimen No. 1 now exhibited

Again this season, in August, on one occasion I met with others similarly distended—specimen No. 2—with the black eyes of the captives shining through the thin integuments of the stomach; but what these are I cannot say, as they are too much decomposed to determine. This season from time to time I have examined the stomachs of a great many herrings; but from the beginning of September till now I have not found one containing food, but generally a little transparent mucus, and sometimes a little air, and however anomalous this may appear, the stomach was generally covered with fat, unless where the roe and milt were becoming large. In such cases, when these increased the fat appeared to become less. These facts are all the more curious that in the months of August and September entomostraca and small larval forms are met with in great abundance, and if we judge of their multitudes by the luminosity of the sea, which in a great measure is ascribed to the presence of these minute animals, we will find the last-named month the most luminous in the year, and yet in these months, particularly September, it appears to be rare to find on this coast food of any kind in the stomach of a herring. Whatever the cause may be, it cannot be ascribed to the want of abundance of food at their command.

As to the questions whether herrings take food indifferently all the year round, or whether they take more at one season than another, or whether they abstain from it for a time altogether, none of the fishermen whom I have consulted seem to have taken these phases of herring life much into consideration. They were all aware that at some particular seasons the stomachs of the herring were generally distended with food, and at other times generally with much less; but whether for a time they abstain entirely or not, none seemed to know, and most were disinclined to believe in their voluntary abstinence from food. The natural answer in most cases seemed to suggest itself, that there was no doubt the herring required *something* to live upon.

Perhaps no fish in the sea has been the subject of so many learned and valuable treatises as the herring; but as the chief points of interest have always been its value as food to man, and how that value could be increased or protected, none of these treatises which I have had an opportunity of consulting refers to any season of abstinence. That they do abstain at particular seasons there can be no doubt, so far as empty stomachs go for proof, a circumstance that may excite less surprise when we take the abstinence of many other animals into consideration.

Mr Haughton, in the September number of the *Intellectual Observer*, 1867, when speaking of the abstinence of the salmon, says:—"With respect to the physiological paradox how an animal can live without food, it must be borne in mind, in the first place, that notwithstanding the voracity of the carnivorous fishes, and their extraordinary digestive capabilities, they are able to exist for long periods of time without food. Gold and silver fishes may be kept for months without perceptible food."

I may adduce another instance of a similar kind in the small marine fish the *Amphioxus lanceolatus*, which I kept for twenty months in a jar containing less than two gills of water, without visible food, or apparent deterioration in the condition of the animal.

Mr Haughton, quoting Dr John Davy, says:—"That the migratory species of fishes, such as the salmon and sea-trout, which attain their growth and become in a high condition in the sea—there abundantly feeding and accumulating adipose matter, though not always abstaining in fresh water, which they enter chiefly for the purpose of breeding—are at least capable of long abstinence there without materially suffering."

That they do suffer, however, to a considerable extent is evident, both in the case of the salmon and herring, by the spent state they are in at the time of spawning.

It is not unlikely that the greater part of the food taken by the herring may assimilate and go to improve the condition of the fish. Entomostraca, apparently their chief food, are exceedingly rich in fatty matter. Quantities of oil may be seen floating on the surface of the water that a number of them have been newly confined in, and must afford a highly nutritious and concentrated meal. But that they should abstain less or more as the breeding season advances, when their demand for food is apparently greatest, is a problem that may be hard to solve.

II.—*On the Distribution of the Helicidæ in Bute and in the Vicinity of Largs.* By Mr William Haddin.

The following remarks on the distribution of the *Helicidæ* in Bute and at Largs are the result of observations made during the two last summers in these localities. Although including by far the greater number of species likely to be found there, the list cannot be considered exhaustive. An enumeration of the species *seriatim*, describing their habitat, is perhaps the best manner in which to treat the subject.

Vitrina pellucida, the sole representative of the genus in Britain, occurs almost everywhere, but in greater profusion on the coast line. In the spring and summer it is scarce, but towards the end of autumn and during winter it may be taken in numbers.

Of the species of *Zonites*, some are difficult to determine from their resemblance to each other. They are all found in Bute, however, although I have not been able satisfactorily to distinguish between *Z. purus* and *Z. crystallinus.* The species of most frequent occurrence are *Z. alliarius, Z. cellarius,* and *Z. crystallinus. Zonites fulvus* seems to be widely distributed, though two specimens seldom occur together. It is to be found under stones in grassy pastures—Chapelton, and meadows—Bute. *Z. radiatulus* I have found but seldom among leaves in wooded glens—Chapelton, Bute, and Brisbane Glen, Largs. Beneath stones on the banks of Loch Ascog and Greenan Loch, Bute, *Z. nitidus* may be found. It does not appear to inhabit the Glasgow district. *Z. nitidulus,* though not mentioned in Mr Dougal's list of specimens found within ten miles of Glasgow, I have taken in Calderwood Glen, as well as at Woodend, Bute. *Z. excavatus* is the rarest species of the genus, and appears to be peculiar to Britain. In the autumn of 1867, I took a single specimen amongst leaves at Chapelton, Bute. Though I sought often there, I was not successful in finding another till last summer, when my search was rewarded by the discovery of numbers in an uncultivated field above Ardbeg Point. This is the most northern locality for this shell, so far as I know.*

Of the numerous species of *Helices* found in Britain, more than half the number are found in Bute. *Helix aspersa* may be taken in countless numbers on the coast line. I remember a wall on the shore at Mount Stuart which was literally covered with this mollusk. In the gardens there it is the most destructive snail. It is remarkable that around Glasgow it should be almost unknown. *H. nemoralis* is a common shell, both inland and on the coast. From Mount Stuart to Kilchattan Bay it may be found in quantities, where the one and the five banded varieties appear to prevail to the exclusion of all others. *H. hortensis* I have never found in Bute, even after repeated searchings. Its great scarceness, compared with the abundance of *nemoralis,* is a fact worthy of note. *H. arbustorum* in Bute occurs but sparingly, and that in the woods behind Kamesburgh, while in Gogo Glen, Largs, it is by no means scarce. *H. caperata* is found on the coast generally distributed. It occurs also on the banks of Greenan Loch. At St Ninian's Bay, Bute, *H. ericetorum* lives in company with the beautiful little *H. pulchella* on the sandy shore. This appears to be the only locality for *H. ericetorum* in Bute, but I have received specimens also from Machrihanish Bay, Campbelton. The occurrence of *H. rufescens* at Bowling has already been brought before this Society. At Broomfields, Largs, in a grassy lane, I discovered a colony this summer. Most of the specimens were albinoes. A single specimen was taken at Etterick Bay, Bute. *H. hispida* and *H. rotundata* are common everywhere. *H. aculeata* and *H. lamellata* are found in company in wooded glens, Woodend, and Mount Stuart, Bute. On the broad leaves of *Petasites vulgaris* in Brisbane Glen, Largs, two species may be taken—*H. sericea* and *H. fusca*. The latter I have also found at Mount Stuart and at Ardbeg, Bute.

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* This species I have lately taken on Ben Nevis, Argyleshire, 1869.

Not a single representative of the genus *Bulimus* occurs in Bute, but at Machrihanish Bay, Campbelton, *B. acutus* has been discovered by Mr Dougal. *Zua lubrica* is a common shell everywhere.

Of the genus *Pupa*, three species inhabit the district which we have in consideration. The most common, *P. umbilicata*, is to be found plentifully under stones and among moss in almost every situation. No shell occurs in such numbers along the coast as this. Along the east shore of the island especially, thousands may be gathered in a short time, every stone, on its under side, being literally covered with them. *P. muscorum* seems to be a much scarcer shell. In Bute I have not been able to find a single specimen, but on the other side of the Clyde, at Fairlie, it dwells in company with *P. umbilicata* on the shore. The remaining species, *P. anglica*, I have taken in Mount Stuart woods on the fallen leaves of the laurel, and in Brisbane Glen, Largs, amongst the debris of a ruin, along with *Helix sericea*.

The genus next in order, *Vertigo*, is unrepresented in the Glasgow district. In Bute two species occur, *V. edentula* and *V. antivertigo*. The former may readily be found on examining the under side of the fronds of *Lastrea filix-mas*—Skeoch Wood and Chapelton—and also under stones on the banks of Loch Greenan. The latter occurs on the banks of Loch Ascog and Loch Greenan. *V. pygmæa*, although said to be the most widely distributed of the genus, is the scarcest in this district. Often have I sought for it on elevated situations, such as it is said to inhabit, but without success, till this autumn, when wandering along the sea-shore at Largs, at Broomcraigs, I came upon the long-looked-for prize, amongst stones just above the high water mark—a situation most unusual for it, so far as I can learn.*

In Mr Dougal's paper already referred to, *Balea perversa* is mentioned as an apparently rare inhabitant of Auchentorlie Glen, Bowling. On the rocks at Bell's Monument I took a number of specimens of this shell lately. At St Ninian's Bay, Bute, it is to be found in colonies, adhering to stones in a loosely built wall on the shore. Under the loose bark of trees, chiefly ash, in many parts of the island, and on high elevations on the hills behind Largs, I have likewise taken it.

Clausilia rugosa is common on the trunks of trees, especially beech, and on mossy walls. Beautiful specimens occur on an old wall at Mount Stuart House.

Succinea putris is not rare on the banks of the lochs throughout the island. In brackish pools, near St Ninian's Bay, it seems to thrive well.

It will be observed, from the preceding remarks, that I have not been able to record a single species from the banks of Loch Fad, while on the shores of Loch Ascog and Loch Greenan are found *Zonites nitidus, Helix caperata, Vertigo antivertigo, V. edentula,* and *Succinea putris.* The reason of this I would not venture to affirm, but it is a fact worthy of note, that the banks of the former are formed of shale, while those of the two latter are of sand. The uncultivated districts, such as Chapelton, the old woods of Mount Stuart, and the coast line, are found to yield many more species than the cultivated parts.

Three species occur at Largs, which do not seem to have found their way over to Bute, viz., *Helix sericea, Pupa muscorum,* and *Vertigo pygmæa.*

In comparing the Glasgow district with the one under consideration, it is observed that two species occur in the former which are absent in the latter—*Helix hortensis* and *Bulimus obscurus;* while peculiar to the latter we have *Zonites nitidus, Z. excavatus, Helix ericetorum, H. sericea, Pupa muscorum, P. anglica, Vertigo antivertigo, V. edentula,* and *V. pygmæa.* I would call attention to the fact that at Bowling the distribution of many of the species occurring on the coast seems to stop short, viz., *Helix aspersa, H. rufescens, H. fusca,* and *Balea perversa.*

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* *Vertigo pygmæa* I have since found on the banks of Loch Ascog, Bute, thus reducing the species found at Largs only, and not in Bute, to two.

I would take this opportunity of recording the following:—*Pisidium cinereum*, from a pond near Bishopbriggs, and *P. amnicum* from the banks of the Clyde above Rutherglen Bridge—not before mentioned from the Glasgow district.

A sinistral specimen of *Limneus pereger*, from a small stream on the banks of the Clyde above Dalmarnock Bridge. (In the following summer, 1868, another specimen was taken there again.)

Planorbis marginatus, hitherto unknown in Scotland, from Lochend, near Edinburgh.

FEBRUARY 23D, 1869.

Mr David Robertson, Vice-President, in the chair. The following gentlemen were elected members of the Society:—Wm. S. Paterson, resident; and George Stabler, Milnethorpe, Westmoreland, corresponding.

The following donations to the library were then announced:—Proceedings of the Berwickshire Naturalists' Club; Proceedings of the Dumfriesshire and Galloway Natural History and Antiquarian Society; Proceedings of the Belfast Naturalists' Field Club—all from the respective societies. Also, "Memoire pour la Connaissance de Crinoides Vivants, par M. Sars;" and "Meteorologiske Jagtagelser," from the Christiania University.

SPECIMENS EXHIBITED.

Mr Henry Dunbar exhibited a series of American land and fresh water shells, belonging to the genera *Helix*, *Helicina*, *Bulimus*, *Conovulus*, and *Succinea*, and made some remarks as to their geographical range and distribution in the States.

The Secretary exhibited a beautifully mottled specimen of the Wood Pigeon, which had recently been obtained near Glasgow, and forwarded by Mr Martin, Exchange Square. The whole of the plumage was spotted with white, giving the bird a very curious appearance. Such varieties very rarely occur in the Ring Dove.

Mr Gray also exhibited a female Sparrow-Hawk which had been captured in the town of Dingwall, under somewhat peculiar circumstances. The bird had apparently been perched on a tree opposite the house of Mr Grigor there, and seeing a canary in a cage suspended at one of the windows, had dashed through a pane of glass, broken the cage, and killed the occupant. It had been trapped a considerable time before, and had entirely lost one of its legs, so that the mischievous act showed an extraordinary amount of daring in a bird with only one foot to deal the blow.

PAPER READ.

The Life of the Boulder Clay Period, as represented in Strata near Crofthead. By Mr JAMES A. MAHONY.

In the course of his remarks he described the geological features of the deposit, and referred to the species of the organic remains found in it, and wound up by stating some conclusions deducible from the subject. The strata, which have partly been laid bare in the cutting of the Kilmarnock and Crofthead Extension Railway, consist of about thirty feet of stratified clay, mud, and sand, resting on boulder clay, and also overlaid by it. The reasons for regarding them as intercalated with the Till, and therefore as being of glacial age, were stated at some length, Mr Mahony's views agreeing with those expressed by Mr James Geikie, by whom the deposit was first described in the *Geological Magazine.** The animal and plant remains were found in two layers of vegetable *debris*, seven feet apart, which occurred in the stratified beds. One remarkable feature about these remains was the exceeding abundance of diatoms, which were found to constitute a considerable portion of the upper leaf bed (twelve inches thick), and to represent ten genera and thirty species. There were also described three species of desmids (one in the sporangial state), eleven mosses, seven flowering plants; and, as representatives of the animal kingdom, one sponge (*Spongilla fluviatilis*), three infusoria, several species of entomostraca (some in the larval state), one of the jaws of a leech, and many fragments of beetles, indicating the presence of at least three species.

In his concluding remarks, Mr Mahony showed that the data pointed to the former existence of a lake, and suggested that we had here confirmatory evidence of the occurrence of an interval of ameliorated temperature during the ice epoch.

In the discussion which followed the reading of this paper, which was illustrated by numerous specimens and drawings, Mr John Young referred to the very great care with which Mr Mahony had worked out and determined the various minute organisms found in the mud bed. He further stated that the antiquity of these organisms, and of the sand and mud beds of the Crofthead section, depended entirely upon the correct identification of a so-called bed of boulder till which was stated to have overlain the mud bed at one point of the section. If this could be shown to have been produced by a land slip of the older boulder till from the hill side over part of the old lake bottom, then the underlying beds, with their organisms, might be of comparatively modern date. Mr Young stated that he had not seen the disputed beds, but that he was very sceptical as to the upper bed of boulder till having been laid down by a second sheet of glacier ice passing along the valley. The thickness of the mud, sand, and gravel beds showed that a long period of time must have elapsed during their formation, and he therefore thought that the whole of the phenomena might yet be explained without bringing in such a great physical revolution as a second ice period. Mr Young also stated some of his objections to the boulder till of the low lying districts of Scotland being viewed as a formation resulting from the melting of a great sheet of land ice lying above sea level, when there is every reason to believe that not only those districts where the boulder till lies thickest, but the whole country was depressed many hundred feet below the present sea level during the great ice period.

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* Geol. Mag., vol. V., p. 393.

The Rev. H. W. Crosskey explained the great difficulties connected with the section, and asked for judgment to be reserved until some fresh cuttings had been exposed. Mr Robertson and himself had found in the clay several species of fresh-water *Entomostraca* which were common in the Paisley Canal at the present day. The boulder clay hangs in patches along the sides of the valley, and has evidently been subjected to great denudation. A mass hanging by the side of the old lake might have been undermined and brought down gradually by the water. On the north east, before approaching the boss of trap, a peaty bed, with nuts and branches of various trees, occurs, evidently of comparatively modern origin. The question is whether the bed in which *Bos primegenius* was found does not correspond with this. There is great difficulty in conceiving how the passage of a second glacier could have left the clays and sands and gravels preserved in their present condition and position. The whole section, however, constitute an excellent debating ground, and for the present Mr Crosskey wished to reserve his opinion.

MARCH 30TH, 1869.

Mr David Robertson, Vice-President, in the chair.

The following gentlemen were elected members of the Society:—Alexander Drew, jun., resident; and the Rev. John Fergusson, Glenprosen, Forfarshire; Rev. James Keith, Forres; and Rev. George Gordon, Birnie, by Elgin, corresponding.

The Society voted a sum of ten guineas as a subscription to the fund now being raised by the University for the purchase of the late Professor Walker Arnot's Herbarium and Library.

The Librarian announced the following donations to the library: "Stainton's Natural History of the Tineina," 10 vols. 8vo, coloured plates, by Dr Hugh Colquhoun; "Quatrefage's Rambles of a Naturalist," 2 vols. 8vo, and "Seaside Book," by Dr Harvey, by Mr A. C. Millar; "Transactions Geological Society of Glasgow," "Transactions Archæological Society of Glasgow," "Proceedings Berwickshire Naturalists' Club," — all from the respective societies.

SPECIMENS EXHIBITED.

Mr James D. Dougall, jun., exhibited a specimen of the Grey Phalarope (*Phalaropus lobatus*), which had been shot in November last on the banks of Lochfyne.

The Secretary exhibited a very fine specimen of the Greenland Falcon (*Falco candicans Gmel*), from Elgin, in Morayshire. The bird had been captured near that town about three years ago, and now belonged to Mr Gray's private collection. Although in bad condition when obtained, it had since been skilfully remounted by Mr M'Culloch, sen., Sauchiehall Street, and is considered to be one of the most perfect examples of this rare species that has ever been taken in Britain. Mr Gray likewise exhibited two rare birds from New Zealand, namely, a specimen of *Apteryx Owenii*, and one of the Owl Parrot (*Strigops habroptilus*), both having been recently obtained in that country by Mr Thomas Yuill, Taxidermist, Sauchiehall Street. Owen's Apteryx is distinguished from the common ki-wi by its somewhat larger size, lighter colour, freckled markings, and general puffiness of plumage. The principal localities it frequents are dense gullies, where it remains concealed during the daytime, and from which it almost never issues until the approach of night, when it ventures out in quest of food. From this habit it is but seldom seen except by the natives, who watch its appearance, and never miss an opportunity of capturing it. They often watch it with great patience in the recesses of the forest for the sake of its fat, which they make use of as a cure for skin diseases. They also use the feathers for dressing fish hooks. The Maories, therefore, tempted by the virtues of ki-wi grease, and the utility of the bird's wiry feathers, seldom think of preserving it for scientific purposes. Hence even the rewards offered to these savages are generally fruitless as regards the acquisition of specimens. The nest of this highly curious wingless bird is found in hollow logs, and is formed of dried ferns and grasses. There is but one egg, which, however, is of great size, weighing about 13 ounces, being almost a sixth of the entire weight of the bird itself. For some of these particulars Mr Gray expressed himself indebted to Mr Yuill, who had lived many years in New Zealand.

The Owl Parrot (*Strigops habroptilus*) was described as another of the weird-looking examples of an ancient avi-fauna not yet extinct. Like the Apteryx, it is strictly nocturnal in its habits, concealing itself in holes and under tree stumps, coming abroad only after sunset. From native reports it would appear that these birds at one time collected together in great numbers in winter, and associated in one congregation in large caves, making a deafening noise when they at first assembled, and again when they dispersed. This singular-looking species possesses but feeble powers of flight, only proceeding a short distance when put up. It is seldom seen in trees, but inhabits the ground, on which its food is chiefly gathered. It appears to make use of its bill in digging up certain roots, leaves, and twigs, on which it constantly subsists. The nest is placed in hollow logs of decayed wood lying upon the ground, and is generally found to contain two eggs. The bird makes a sort of pathway leading to it, and this track is so conspicuous (being about a foot in width) that it often misleads the traveller, who imagines he has found the track of human footsteps.

It has lately been doubted if any of these birds survive in New Zealand, which country, so far as is known, is or was its only habitat. The present example was obtained in the south island in March, 1868, within seventeen miles of the town of Nelson; and the specimen of Owen's Apteryx was killed at the same time and place.

The Secretary exhibited a specimen of the Spotted Sandpiper (*Totanus macularius*), which had been forwarded by Mr W. C. Angus, Aberdeen, corresponding member. The bird was one of a pair obtained near that city in August, 1867. Mr Gray said that although the Spotted Sandpiper had been introduced as a British species by the late Mr Yarrell many years ago, in his work on British birds, none of the numerous records of that writer regarding that bird could well stand scrutiny.

PAPER READ.

Remarks and Notes of Correspondence on the identity of Heterophyllia Lyelli and H. mirabilis of Duncan. By Mr JOHN YOUNG.

PLATE IV.

The following paper and subsequent correspondence, upon the identity of two recently-described species of carboniferous corals from Scotland, appeared lately in the *Geological Magazine*, and as the errors in the description of these corals which I attempted to point out, have been denied by Dr Duncan of London—the author of the species in question—I have thought fit to place my remarks, and the specimens upon which they are founded, before the Society, with the correspondence for and against their identity, so that members may have an opportunity of judging for themselves whether there are really two species of this coral, and whether its spines were articulated upon tubercles as asserted by Dr Duncan.

My criticisms were not written in any hostile spirit, or with a wish to find fault with what Dr Duncan had done. My object was to point out several mistakes into which I believe he had fallen, from not having seen all the examples of the best preserved specimens of the coral that had been obtained.

My remarks in the *Geological Magazine* are as follows:—

In a paper published in the Phil. Trans. of the Royal Society of

London,* Dr Duncan has figured and described six new species of carboniferous corals, belonging to the genus *Heterophyllia* of M'Coy, from specimens found in Scottish carboniferous limestone strata. Of these species two, *H. Lyelli* and *H. mirabilis*, seem to be founded on portions, which the careful examination of better preserved specimens would have shown to belong to only one good species.

I would not have ventured to make the following remarks upon these corals, had not the localities from whence they are obtained been long and familiarly known to me; and I am satisfied, after a careful examination of more than fifty specimens, large and small, and in all states of preservation, that they all belong to one species, in which the external characters and internal structure vary to a certain extent.

In order to show the close connection that exists between these two so-called species, I will quote Dr Duncan's description of the corals, side by side, with the parts numbered, so that the points of specific distinction may be more easily perceived, and will then make my remarks in support of what I consider their identity.

Heterophyllia Lyelli, sp. nov., Duncan.	*Heterophyllia mirabilis*, sp. nov., Duncan.
1st. The corallum is very long, very slender, and is slightly bent.	1st. The corallum is tall, very slender, and nearly straight.
2nd. The costæ are large, smooth, and rounded; they project, and are marked with occasional tubercles, pits, and grooves.	2nd. The costæ are narrow, rounded, smooth, and slightly projecting; they have tubercles at regular and frequent intervals. These tubercles are rounded and oblique, and project slightly. To each of them is articulated a curved hook-shaped process, which stands out from the costæ and the tubercles, its concavity being directed inwards and downwards.
3rd. The intercostal spaces are wide and shallow, and equal; they are slightly concave, and are marked with festoon-shaped ridges or lines.	3rd. The intercostal spaces are shallow, wide, and usually convex, but occasionally concave; they are marked with three longitudinal delicate shallow grooves, with very slightly rounded longitudinal eminences between them. A groove is central.

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* On the Genera *Heterophyllia*, *Battersbyia*, *Palæocyclus*, and *Asterosmilia*; the Anatomy of their Species, and their position in the Classification of the *Sclerodermic Zoantharia*. By P. Martin Duncan, M.B. Lond., F.G.S., Secretary to the Geological Society.—Read May 2, 1867.

4th. The horizontal section of the corallum is hexagonal in outline; the wall is stout and thick, and only very slightly concave between the costæ.	4th. The horizontal section of the corallum is nearly circular; there are projections which correspond with the costæ; and the wall is moderately thick.
5th. The surface of the corallum is smooth and plain.	5th. The surface of the corallum is smooth.
6th. There are six septa, which are united by a linear septal columella.	6th. There are six septa, which are united by a linear septal columella.
7th. The endotheca is tolerably abundant.	7th. The endotheca is scanty, and the dissepiments are wide apart.
8th. The diameter of the corallum is 1-10th inch or less.	8th. The diameter of the corallum is rather more than 1-20th inch.
9th. In the carboniferous limestone of Craigenglen, Stirling, and Brockley, Lesmahagow, Lanarkshire.	9th. From the carboniferous limestone of Craigenglen and Brockley.

From the above descriptions it will be seen that the two species, as described by Dr Duncan, have many characters in common, and I am satisfied that, had he examined a larger number of specimens, he would have found every variety connecting them.

In the first place, this coral has never, so far as I am aware, been found with its extremities perfect, fragments occur from three to four inches in length, but generally it is found in shorter pieces; these are of every diameter between $\frac{1}{10}$ and $\frac{1}{40}$ inch or less. One specimen $3\frac{1}{4}$ inches in length, tapers in that distance from $\frac{1}{12}$ to $\frac{1}{20}$ inch in diameter, showing that measurements from fragments of various sizes are of no specific value.

All the larger specimens are more or less flexuous, some of them being much curved, and occasionally bent at right angles; this is the case with both stout and slender specimens of the corallum.

The curved hook-shaped processes which are described as one of the principal specific characters of *H. mirabilis*, I consider as of no value in distinguishing that species, for we possess specimens of every diameter as formerly quoted, showing these little hooklets. On nearly every specimen which is found embedded in the shale, they may be exposed with careful manipulation. Indeed, it seems to have been the perfect condition of the corallum, large or small. In weathered specimens of the stems, found lying upon the shale-banks, the hooklets are always broken off, but their bases may still be traced upon the costæ, or in the grooves to which they were fixed.

Dr Duncan states that *H. Lyelli* is only occasionally tuberculated, but the specimen of this species which he figures in pl. xxxi., fig.

4, c., is as regularly tuberculated as that shown in his figures of *H. mirabilis.* Except in very much worn specimens, the tubercles are always present upon both large and small diameters of the corallum, and as they are sometimes seen to vary slightly in number and regularity, even upon parts of the same stem, mere irregularity of occurrence is not, therefore, to be considered of any specific value.

The costæ and intercostal spaces are also characters that vary considerably in this coral, and cannot, I think, be depended upon as points of specific distinction, as some specimens of the largest diameter have costæ less developed than those seen upon more moderately sized stems. The intercostal spaces are wide, shallow, or deep, according to the diameter of the specimen, and the prominence of the costæ.

In *H. Lyelli*, the horizontal section of the corallum is stated to be hexagonal, in *H. mirabilis*, mostly circular; this is a point that appears to me of no value in the diagnosis of the species, as the section varies with the prominence of the costæ and the convexity or concavity of the intercostal spaces, and this variation may sometimes be seen upon the same specimen. In general, the greatest number of specimens of all the various diameters met with, approach the hexagonal form; one specimen, however, in my collection shows, in a cross section, a stellate or six-sided angular form, and another well marked fragment is quadrangular in section, having four small tuberculated costæ. Internally this specimen has only four septa corresponding with the costæ, instead of six, the normal number. Other specimens occur which show a nearly circular section, and on some of these, instead of costæ, we have only longitudinal grooves to the floor of which the hooklets were fixed. These differences in the external form of the stem of the corallum I consider to be mere exceptional variations of one species.

The endotheca and dissepiments are also characters that vary. In many specimens the endotheca has either never been well developed or has been destroyed by the crystallization of the internal structure of the corallum. The dissepiments are stated to be wide apart, but one longitudinal section shows 30 in the length of one inch, being less than one half line apart.

It will be seen from the above remarks that this coral varies, to a certain extent, both in its external form and internal structure, many of its parts depending upon the state of preservation in which we find the specimens. It seems to me that Dr Duncan has taken the specific characters of *H. Lyelli* from the lower portion of a stem with the hooklets broken off and slightly worn, and his *H. mirabilis* from the upper or more slender part of a stem, as seen lying in the shale, with the hooklets in position.

There is one important mistake which Dr Duncan has committed in his description of *H. mirabilis*, to which I wish shortly to refer. He states that the curved hook-shaped spines or processes, which stand out from the costæ, were articulated to the tubercles upon the costæ, and he gives several figures to illustrate what he supposes was their mode of attachment. This view is not warranted by an examination of several fine specimens in my own collection and in that of Mr James Armstrong, which are embedded in shale, and show the hooklets in position.

These were not hooklets articulated upon tubercles, but small, curved, spinous processes immoveably attached to the stem, either upon the costæ or in grooves. At their base these processes seem to have been tubular, and when broken off and a little worn, as seen in weathered specimens, they then present a deceptive appearance as of a small rounded tubercle, with a pit in the centre, which is caused by the hollow base of the spine.

In nearly every specimen in which these delicate little hooklets are preserved in position, they are seen to be fractured close to their attachment with the stem. This has been produced by the pressure to which the corallum was subjected while lying in the soft shale. It is easily seen, from the irregular way in which they are fractured, that they were broken off by pressure, and not by any process of disarticulation. On some specimens there is still to be seen, at rare intervals, a single spine attached by its solid base to the stem, while on numerous other examples, where the hooklets have not been fractured quite close to the stems, their bases are seen projecting a short distance from the costæ. In one specimen the hooklet has been broken off near the stem, but the matrix retains a cast of the detached spine; the contour of which, from base to apex, is perfectly even and unbroken, an appearance incompatible with the alleged mode of attachment. The above facts clearly show that there was no articulation of their bases upon rounded tubercles, which would, it appears to me, be quite an anomaly in the structure of a zoophyte.

A specimen of what seems to have been a fragment of this coral was figured by David Ure in his Natural History of Rutherglen and East Kilbride, in the year 1793, pl. xix., fig. 11. Ure does not describe the specimen further than by stating that it was beautiful on account of its denticulation, and that it was rare. He placed it among his Coralloides.

Prof. M'Coy's *Serpula hexicarinata* evidently belongs to this coral, or to a closely allied species of *Heterophyllia*. His specimen seems to have shown no internal structure, nor any of the external spinous processes: this led him to conclude that it was some anomalous species of *Serpula*. The absence of structure and external markings may have been due to the specimen having been preserved in a crystalline limestone. M'Coy thus defines the organism in his carboniferous fossils of Ireland. "*Serpula hexicarinata*, pl. xxiii., fig. 28, sp. ch. Elongate, slightly flexuous, hexagonal; sides nearly equal, smooth, flat; rounded, prominent keel on each of the angles. This species is easily distinguished from any other of the Palæozoic *Serpulæ*, by the hexagonal form of the tube, and the six narrow rounded keels on the angles. Length usually about two inches, width half a length."

So closely does the above description answer to small, worn specimens of *H. mirabilis*, that my specimens were long identified with M'Coy's fossil, and as such appeared with his name in my lists with a (?), as I was satisfied that it could not belong to the genus *Serpula*, but was a zoophyte closely allied to other forms I had found at Brockley near Lesmahagow, which Dr Duncan has now placed, no doubt correctly, among Professor M'Coy's *Heterophyllia*.*

Craigenglen, Campsie, has yielded the finest preserved specimens of the coral under discussion, and as these specimens seem to prove the identity of the two so-called species, one of the specific names adopted by Dr Duncan must be allowed to drop. I would, therefore, suggest that that of *H. mirabilis* be the one retained, as it is given to the specimen which represents the most perfect condition of the coral.

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* In the Catalogue of the collection of fossils in the Museum of Practical Geology, page 129, *Serpula hexagona* is mentioned from the Glasgow district. Unfortunately, as the authorities for the species are not given in that work, I am unable to state whether that species be the same as M'Coy's *S. hexicarinata*. But I suspect that it is, and if so, then it must be referred to the genus of corals in question, for I know of no hexagonal form of *Serpula* from the carboniferous strata of Scotland, especially from the Glasgow district, with the fossils of which I am well acquainted.

The foregoing remarks called forth some correspondence in the November number of the *Geological Magazine*—from Mr De Wilde, the artist who drew the figures of the corals for Dr Duncan's paper; from Mr Fielding, another artist, to whom Mr Woodward, the editor of the Magazine, had submitted the series of specimens I had forwarded for examination, illustrating all the various states of preservation in which the coral is found; and we had also a few remarks from Mr Woodward himself.

In the following remarks upon the correspondence which ensued, I will only very briefly refer to those points bearing upon the subject under discussion:—Mr De Wilde states that the specimens which he figured presented a "bulb with a pit in its centre, and the slight concavity at the base of the hooklet." He further states, "Supposing the articulation to be a mistake, these fragile appendages would hardly break invariably at that point where they are stoutest and strongest." Mr Fielding states, "That it is easy to select specimens from those sent by Mr Young, which present rows of tubercles the exact counterpart of those figured by Mr De Wilde. On the other hand, however, there are amongst Mr Young's specimens some which present characters differing greatly from those figured in Dr Duncan's plate, and in which the hooklets are broken off at various distances from the costæ—in some cases even close up to the body of the coral, leaving a concave cicatrix instead of a tubercle." Mr Woodward, amongst other remarks, states, "Mr Young, in his paper, says, if a coral had spines articulated at their bases upon rounded tubercles, such a structure would be quite an anomaly in a zoophyte. We must beg Mr Young not to reject a discovery because it is anomalous. Palæozoic life-structures present many strange features."

In the December number of the Magazine there was some further correspondence from the pen of Dr John Young, Dr Duncan, and myself. It may here be proper to state, that before writing the remarks upon the identity of the two species of this coral, that Dr Young minutely examined, along with myself, all the best preserved specimens of the coral that I could find, and we came to the conclusion that they ought to be considered as belonging to one species; and further, that the so-called articulation of the hooklets upon tubercles could not be held as tenable, and he agreed with Mr Armstrong and myself in viewing them as solid processes that had become fractured from the stem by pressure.

Dr Young, in his note to the editor of the Magazine, says, "Mr De Wilde's letter is quite satisfactory. Had the appearances referred to by Mr Young been present in Dr Duncan's specimens, neither he nor Mr De Wilde would have failed to notice them. It is therefore to be regretted that you did not submit Mr Young's specimens to that artist, who has an interest in the matter, rather than to Mr Fielding, who has none. The testimony which that gentleman volunteers is, however, of value, as confirming the only inference possible from the statements and figures, that the specimens of *Heterophyllia* are variously preserved, and that Mr De Wilde has not seen all the varieties."

Dr Young, in reply to Mr Woodward's remarks, says, "I am unaware, of course, of your reasons for adopting a somewhat unusual style of comment on Mr Young's paper. He does not, however, as you say, 'object to a discovery because it is an anomaly.' He thinks the appearances may be otherwise interpreted, and that so unexpected a phenomenon as articulated spines on a coral requires more evidence in its support than has been adduced. Anomalies, in other groups of animals, furnish no argument in support of this particular one. Mr Young thinks his specimens justify him in taking exception to Dr Duncan's paper on two grounds: 1st. That *H. Lyelli* and *H. mirabilis* are not distinct species; 2d. That neither possessed articulated spines. The criticism of published species is neither an unusual nor a hurtful proceeding, and I should have been unwilling to interfere in the matter, which rests entirely between Dr Duncan and Mr Young, but having seen the specimens, I am satisfied that the difference of opinion, at least on the second of Mr Young's criticisms, is due to difference in the state of preservation of the fossils."

In my reply to the statements of Messrs De Wilde and Fielding, I mentioned, amongst other points, that "the mere rounding of the base of the spines, so as to resemble tubercles, seen upon some specimens, stands for nothing in the face of the important fact which numerous others go to prove, viz., that these tubercles are not rounded in the better preserved specimens, and that they are, in fact, only the fractured bases of the spines or hooklets." To Mr De Wilde's statement, where he says, "supposing the articulation to be a mistake, these fragile appendages would hardly break invariably at that point where they are stoutest and strongest," I replied, that "he must remember that although this be their thickest part, yet it is their weakest point in their relation to the stem," stating, as points in illustration, "that twigs torn from the stem of a plant naturally break close to their attachment to the stem, yet this is also their thickest point; and that the spines of the *Productæ* found in our soft shales are seen in most cases to be fractured close to their attachment to the shell, owing to the pressure they have sustained;" and further stated, "that this fracturing of the spines by pressure was not always regular in its distance from the organism, either in the *Productæ* or the coral in question, as some of my specimens in the hands of Mr Woodward clearly showed."

Dr Duncan, in his reply to some of my remarks, says, that "really the slightest possible examination of the specimens proves that the appearance of irregular fracture of the spines is the exception, and that which I have described is the rule. The irregular fracture has been produced by pressure, which has acted more upon the base of the tubercles than upon the junction of the hooklets with the tubercles. Probably some anchylosis had occurred, and the joint had been destroyed."

Dr Duncan, in his further remarks, does not advance a single fact beyond what I have already quoted, either for considering the above corals as two distinct species, or in support of the so-called articulation of the hooklets. He says, "I am content to abide by the decision I came to whilst the *Heterophyllia* in the Hunterian Museum of Glasgow were still called *Serpulæ*, and to consider *H. Lyelli* and *H. mirabilis* very interestingly separate species." The rest of his note consists of a personal attack upon myself for venturing to criticise his (Dr Duncan's) work. To his personal remarks I thought it unworthy to reply in my concluding note in the Magazine, except in stating, "that my object was to try and settle the determination of the coral in question, not the qualifications of palæontologists." To his assertion, that irregular fracture of the spines is the exception and not the rule, and the assumption of anchylosis of the joint, I stated, "that it entirely begged the question, and that after what I had written I thought I was justified in disputing assertions, however authoritatively stated."

I may here remark that Dr Duncan's admission, that probably the bases of the spines had become anchylosed upon the tubercles, and that the joint had been destroyed, is to me one of the weakest points in his whole argument; and I think that it must be apparent to nearly every one that it would have been better, and perhaps more honest, if he had frankly admitted that he had been mistaken as to the articulation of the hooklets, and acknowledged them at once as having been solid appendages, instead of making a half admission that they are really so, by his assumption of anchylosis of the joint.

With regard to his statement, that this coral was allowed to lie in the Hunterian Museum, under the name of *Serpulæ*, it shows that he must have been misinformed upon the subject. The museum, as yet, has never possessed any examples of this organism. My remarks are founded upon specimens in my own collection and that of Mr Armstrong. In the list of fossils in my paper on the "Geology of the Campsie District," page 57, I there state that "finely preserved specimens of this organism are found in the shales of Craigenglen; that they agree externally with M'Coy's figure of *Serpulæ (?) hexicarinata*, but are probably zoophytes, as they are divided internally with septa and tabulæ, and have numerous slender hook-like spines on each of the keels."

To show still further that I was not entirely ignorant of the structure of this organism, I have here a transparent vertical section of the coral which I exhibited, along with my collection, at the British Association Meeting in Glasgow in 1855. I also, while in London in 1861, submitted some of my specimens to Mr Salter, then in the Jermyn Street Museum, and to the late Dr Samuel Woodward, of the British Museum. They both agreed with me as to its close identity with M'Coy's figure of *Serpulæ hexicarinata* (a point which Dr Duncan in his description has overlooked); but they were satisfied, from both the external and internal structure, that it was not any species of *Serpulæ*, but a peculiar and undescribed zoophyte. The idea, however, of its having had articulated spines never entered into the minds of any one to whom I ever submitted this coral, nor have I ever seen a single specimen which, on close examination, represents such an appearance, or that would warrant the conclusions of Dr Duncan.

There are two other points to which I wish to call your attention, beyond what has been already stated in the remarks and correspondence. The first is one which appears to me to go hard against the supposition that the hooklets were ever articulated upon tubercles by any ligamentary process. The fact stands thus: all the specimens of this coral are found in marine limestone shales, associated with a great many genera and species of organic remains, consisting of corals, crinoids, echini, mollusca, etc. These all bear evidence of having lain for some time upon the sea-bottom after the death of the organisms, during which the ligaments that held them together had in most cases gone to decay, and allowed their parts to be scattered about by the waves and currents, before becoming embedded in the mud in which we now find them. If this has been the case with large organisms bound together with strong ligaments, we would hardly expect that those which are said to have attached these delicate hooklets to the stem of the coral would have remained uninjured. Indeed, if they had ever been articulated, I would have considered it one of the rarest things to have found a specimen of the coral with the hooklets attached, as rare as what it is to find in the same strata, any of the remains of the crinoids, echini, or chitons, with their parts preserved in their relative positions. But if the hooklets are viewed as solid processes upon the stem of the corallum, we can then easily perceive how they may have been preserved in most instances after the death of the organism, their present fractured state being the result of the pressure they have sustained while lying embedded in the shale.

The second point to which I wish to make reference before closing this paper, is that Dr Duncan in his description of *H. Lyelli* makes no mention whatever of that species having borne hooklets upon the costæ. He only states that it was marked with occasional tubercles, but makes no inference as to what could have been their use. I think that every one who examines the specimens upon the table will admit that the largest diameters of the corallum as well as the smallest, bore these hooklets; also, that the so-called tubercles are nothing but their broken bases. It was unfortunate that Dr Duncan's specimens did not show these hooklets, and that he should have attempted to found specific distinctions upon fragments, which every one who has had any opportunity of examining this coral, will consider to have been imperfect examples of the organism in question.

NOTE.—I am glad to be able to state that since the date on which this paper was read, Mr David Robertson has carefully examined, under the microscope, all the specimens of this coral in the collection of Mr James Thomson, upon which Dr Duncan's figures and descriptions were founded, and that, with a knowledge of all the disputed points before him, Mr Robertson has failed to see any evidence in these specimens of articulated hooklets. Dr Young, who has also examined Mr Thomson's specimens, confirms Mr Robertson's opinion, and says, that they present the same irregular fracture of the hooklets at their base as seen in our specimens—an appearance not represented by any of the figures drawn by Mr De Wilde.

EXPLANATION OF THE FIGURES OF PLATE IV.

Fig. 1.—*Heterophyllia mirabilis.*—Portion of a finely-preserved specimen of the coral, embedded in shale, showing several of the hooklets in position, and the irregular way in which they have been fractured at various distances from the stem of the coral by pressure. From the collection of Mr James Armstrong.

Fig. 2.—Another specimen out of the matrix, showing the projecting bases of several hooklets, and the very irregular manner in which they are seen to be broken on many specimens of the coral.

Fig. 3.—Vertical section of a portion of one of the largest diameters of the coral, in which the dissepiments are only one half line apart, or about thirty in the length of one inch.

Fig. 4.—Vertical section of another specimen, in which the dissepiments are more wide apart.

Fig. 5.—Horizontal section, showing the normal form of the coral, and the septæ and endotheca, when well preserved.

Fig. 6.—Horizontal section of a stellate, or six-sided angular variety.

Fig. 7.—Horizontal section of a nearly circular variety, in which the hooklets are planted in grooves on the stem instead of upon costæ.

Fig. 8.—Horizontal section of a four-sided or quadrangular variety, having only four septa corresponding to the number of costæ.

Figs. 9, 10.—*Trigonocarpum (?).*—A fossil fruit (natural size) from the carboniferous limestone shales, Calderside, High Blantyre. Referred to in Part I., page 203, of this Society's "Proceedings." 9, View of calyx; 10, Side view of shell.

Note.—All the figures of the corals are enlarged from four to six times.
Figs. 2 to 8 are from specimens in Mr J. Young's collection.

APRIL 27TH, 1869.

Mr David Robertson, Vice-President, in the chair.

Mr John Bell, Mossvale, Paisley, was admitted a resident member, and Captain H. W. Feilden, 18th Hussars, Junior United Service Club, London, a corresponding member of the Society.

The Librarian announced, as a donation to the Library, from the Royal Physical Society of Edinburgh, a complete set of their published Proceedings.

SPECIMENS EXHIBITED.

The Chairman exhibited a living specimen of a rare sea anemone —*Peachia triphylla*—from Cumbrae, in the Firth of Clyde. Mr Gosse, in his work on this class of Zoophytes, gives the Channel Islands as the habitat of the species. He had never seen it himself, both descriptions and drawings having been supplied to him by Dr Wallich. Mr Robertson described the habits of the creature in captivity, regarding which nothing appears to have previously been noticed.

Mr Robertson also exhibited two *Nudibranchs*, new to Scotland, namely, *Doris proxima* and *Eolis glauca*, both from Cumbrae—the former having hitherto been considered peculiar to the Mersey, and the latter to the Devonshire coast. He likewise described the habits of both in confinement, and their distinguishing characteristics, and explained the means by which he had been enabled to keep them alive so as to observe their movements.

Dr W. L. Stewart, of Bothwell, exhibited a collection of reptiles, insects, and *Arachnidæ* from Western Africa. Among these were conspicuous a scorpion, remarkable for its great size, and a double-headed snake; the whole of the objects being in a beautiful state of preservation.

The Secretary drew the attention of the meeting to a very interesting series of British birds' nests and eggs, which had been sent for exhibition by Mr James Thomson, late of Dunmore. The collection, prepared by Mr Thomson himself, was distinguished for great neatness and accuracy in its arrangement.

Mr James Dairon exhibited a series of *Graptolites* from the Silurian shales of the Moffat district, belonging to the genera *Graptolites*, *Diplograpsus*, *Didymograpsus*, *Dichograpsus*, and *Rastrites*. In the course of his remarks, Mr Dairon pointed out some of the physical features of the Moffat district and the nature of the strata in which the *Graptolites* are found. He next referred to the characters of the several species which he exhibited, and how the different genera were distinguished from one another; and also pointed out and referred to other districts in the south of Scotland, and several other parts of the world, in which this interesting class of organisms had been found. In no other place in this country do they seem to occur in such great abundance, or of so many genera and species, as in the dark semi-aluminous shales of Hartfell, Garpel, Bell Craig, and Dobs Linn, all in the vicinity of Moffat. Mr Dairon concluded his remarks by referring to the various countries from which *Graptolites* have been recorded, stating that they characterise the Silurian system, and especially its lower divisions. He believed that although a considerable amount of work had been done in the investigation of the Moffat shales, much still remains to reward the labours of future investigators, as is evidenced by the number of new species of *Graptolites* and *Phyllopod crustaceans* which have been discovered within the last few years.

Mr George J. Combe exhibited a large and beautifully prepared collection of British and Exotic Ferns. Among the former there were specimens of *Asplenium fontanum*, *A. Germanicum*, and *A. septentrionale*, *Polypodium alpestre*, *Athyrium Filix fœm.*, var. *Victoriæ*, *Lastrea remota*, *L. Barnesii;* also *Trichomanes radicans*, and *Lastrea cristata*, both from the only known Scottish habitats. Mr Combe also exhibited *Elatine hexandra*, *Linnæa borealis*, *Eriocaulon septangulare*, and the very rare *Menziesia cœrulea*, from the only known habitat in Britain; also part of the stem of a vine, seventy-five years old, cut down in January last in the gardens, Buchanan House. It measured about five inches in diameter.

PAPERS READ.

I.—*On the Birds of Ayrshire and Wigtownshire.*

By Mr ROBERT GRAY, Secretary, and Mr THOMAS ANDERSON, Corresponding Member.

INTRODUCTORY REMARKS.

The counties of Ayr and Wigtown present many interesting features, which appear to be intimately associated with a profusion of bird life. A glance at the position and configuration of the districts of Kyle, Carrick, and Galloway, will show that the entire coast outline indicates a variety of locality sufficient to attract, and in many instances retain, species of a wandering habit elsewhere.* Luce Bay, and the Bay of Wigtown, with their far-stretching sands, and Loch Ryan, with its sheltered nooks and shores, draw large numbers of waders and waterfowl. Burrow Head and the Mull of Galloway furnish haunts for cliff-building birds, and for the peregrine and lively chough; while the many caves which intersect the precipitous rocks from Ballantrae to the entrance to Glen App, afford shelter to the rock-dove and cormorant. In inland quarters, on the other hand, the numerous lochs scattered over both counties draw flocks of fresh water species, and not a few rarities, as the black tern, garganey, osprey, and wild swan; the high rocky cliffs harbour the raven and eagle; the moors the merlin and hen harrier, dipper and ring ouzel; while the glens and valleys, from their extremely inviting aspect, give encouragement to a number of soft-billed birds, among which may be noticed the grasshopper warbler and lesser whitethroat.

In addition to its many other attractions, this district possesses two isolated breeding places for gulls and guillemots—viz., Ailsa Craig in the Firth of Clyde, and the Scaur Rocks in the Bay of Luce. The former, being one of the most extensive nurseries for sea-fowl in Great Britain, is in some respects peculiarly interesting—the Iceland gull and little auk having been seen there in summer; while among land birds it can still rank as occasional visitants both the golden and white-tailed eagles, the deserted eyries of which are yet shown to the inquiring visitor. The Great and Little Scaur, a small group of rocks situated near the entrance to Luce Bay, and about midway between the Mull of Galloway and Burrow Head (the former headland itself being an extensive breeding place), are frequented by numbers of guillemots, razor-bills, and puffins, etc., which incubate there as at Ailsa. These two breeding places, with many of the inland lochs, which are occupied by the black-headed and lesser black-backed gulls, enable us to include a number of resident birds which other districts do not possess; and as a fair proportion of the rarer stragglers have appeared from time to time within our limits, the catalogue may be regarded as somewhat fuller than can be expected from a more central district, or even seaboard counties further north.

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* We may here recommend to the notice of ornithologists, in consulting this or any future catalogues that may be published, "Philips' Travelling Map of Scotland," in which the various headlands, lochs, and islets are very correctly named and indicated.

The Solway Firth appears to lead some of the characteristic birds of the south towards the east, and thus forms a kind of barrier to their wanderings into Scotland by the shorter route of crossing the water; thus even species swift of wing, such as the black tern (*Sterna nigra*) and shoveller duck (*Anas clypeata*), travel eastwards, tempted by the inviting shores of the Solway, until they are gradually led through Roxburghshire into Berwickshire, whence they speed northwards. We therefore find these birds appearing much more frequently in East Lothian and Fife, especially in the vicinity of the rivers Tyne and Eden—these estuaries being sufficient to arrest them for a time in the course of their journey. The Ruff (*Machetes pugnax*) is another example of the influence of the Solway in arresting, or rather diverting the direction of the flight of English birds. It is seldom or never found in Wigtownshire or Ayrshire, while it is tolerably common in the estuaries just named. We draw this inference advisedly, seeing that two of the species at least which we have mentioned are at times abundant in Lancashire. On the banks of the Ribble the ruff is plentiful, while in most of the *meres*, as the patches of fresh water there are called, the shoveller is equally numerous, as many as a dozen or fifteen specimens having been sent to the Preston bird stuffers in one day.

As a post of observation for the migratory movements of birds from the remoter districts of western Scotland, the Mull of Galloway is, perhaps, not to be excelled. At the Lighthouse numerous species appear at the time of setting out from our shores, and are sometimes driven back by adverse winds. Even the Waders, such as the knot and sandpiper, are caught on the lantern, upwards of 300 feet above the sea level; and the ring ouzel and gold-crest are likewise captured—the latter in great numbers. In many of the woods near Newton-Stewart, and extending from that westwards to the Rhinns of Galloway, very great flocks of migratory species collect in the end of autumn, and appear to wait a favourable opportunity of effecting a start. We have also noticed that, in the south of Wigtownshire, early migrants, such as the swift, sensibly increase in numbers as the time for their migration approaches. Large flocks from the north may even be seen passing southwards on the west side of the Rhinns, and steering at a considerable height in the air, with a strong and steady flight, and with apparently no intention of halting until their journey is accomplished.

Looking to the fact that there are so many safe places of refuge westward of our district, where the birds of the Hebrides assemble during winter, we naturally do not look for many marine species whose boundary line, so to speak, may be said to be north of the Solway. The Scoters, for example, are almost wholly absent, and we listen in vain for the wildly-musical call note of the long-tailed duck—a species of constant occurrence within the circle of the inner islands. On the other hand, such birds as the quail, which evidently come to us from the Irish coast, where they are taken in some numbers, are familiar in almost every parish—their soft and gentle note on dewy evenings being a well-known and pleasing sound in the summer months.

In conclusion, we may remark that, contrasted with a county like Aberdeenshire, which may almost be called the opposite extreme of our district, there are many differences at once apparent. Several North American land birds and Waders, which would seem to travel to this country *via* Greenland, Iceland, and the Faroe Islands, and thence by Orkney and Shetland to the outlying shoulder of Scotland represented in the shires of Banff and Aberdeen, are never seen with us; while, as an offset to this deficiency, we have large and interesting migratory flocks from the central and western portion of our island lingering at the fall of the leaf in our famed glens and valleys, and beside our brown moors, ruined castles, and the banks of our brawling rivers, as if telling us, in their changed notes of autumn, that they are reluctantly preparing to quit our shores.

It only remains to be added, that considerable care has been bestowed in authenticating the information contained in this catalogue. We have traversed a large extent of both counties in quest of species, and have, for the last fifteen years, been almost daily adding to our observations from which the short notes on each of the birds have been selected. These pleasant rambles and excursions, undertaken of late years for the twofold object of investigating the ornithology and palæontology of the glens and hills of Ayrshire, have enabled us to give a somewhat accurate idea of the species to be found within their boundaries. A considerable number of the birds enumerated have been procured by ourselves, and preserved as cabinet specimens, and we have seldom introduced a species that has not come under our own personal notice. For some of the specimens obtained, we have been indebted to Dr William Anderson, now of Brigus, Newfoundland, whose observations have likewise been of service to us.

One or two remarks on certain birds injurious to farmers have been inserted on the authority of Mr Anderson, who has for some years directed his attention closely to their habits, and who has now matured these at a time when a full knowledge of the subject is of some importance both to the bird student and agriculturist.

CATALOGUE OF SPECIES.

RAPTORES. *FALCONIDÆ.*

THE GOLDEN EAGLE (*Aquila chrysaëtos*).

This splendid bird of prey, formerly so well known in many parts of Scotland, is now extremely rare. A stray visitant is seen at uncertain intervals on Ailsa Craig, especially in spring, when the rabbits are being trapped and disembowelled on the rock. It still breeds in Kirkcudbrightshire. In a work entitled, "General View of the Agriculture of the County of Ayr," etc., published by William Aiton, writer, Strathavon, in 1811, the following passage occurs:—"Eagles formerly abounded so much about Loch Doon, in the higher parts of Carrick, as to prove formidable enemies to the helpless sheep for many miles round their haunts. They have been much reduced in their numbers by the shepherds, but they are by no means extirpated. They still hatch in the most inaccessible rocks, and occasionally carry off, in their powerful talons, a lamb to feed themselves and their young."

THE WHITE-TAILED SEA EAGLE (*Haliaëtus albicilla*).

Within the last thirty years this eagle has been gradually becoming scarcer, and can now only be regarded as a very rare straggler. Wandering examples of the bird are still met with in the Firth of Clyde, resting occasionally on Ailsa Craig, where the species formerly had an eyrie. These probably come from Islay, which is yet frequented by two or three pairs, although it is doubtful if they now breed there. A specimen was obtained early in May at Dunoon a few years ago; and so long as the species maintains its hold of the numerous romantic headlands in Western Scotland, we may expect to meet with stray specimens at that season of the year when eagles are most inclined to wander from their ordinary haunts.

THE OSPREY (*Pandion haliaëtus*).

About fifteen years ago the osprey frequented Loch Doon with some regularity. One bird at least might have been seen fishing in the loch, and perching at times on the boulders near its banks. This was thought to be a male in quest of prey to carry to his mate incubating on an islet in a small loch in Wigtownshire, where we have good reason for saying a frequented eyrie still exists.

THE PEREGRINE FALCON (*Falco peregrinus*).

This handsome falcon, although much reduced in numbers of late years, is found in both counties, frequenting places where it has been known for many generations. There are still two eyries at the Heads of Ayr, and one on Ailsa Craig. Mr Gray has also seen one at Burrow Head. In the wilder parts of some of the inland districts it is also familiar to game preservers as a destructive enemy to grouse and black game. The peregrine is yet comparatively common in Kirkcudbrightshire.

Mr Ewen, of Ewenfield, Ayr, some months ago communicated to the *Sporting Gazette* a somewhat interesting incident which occurred within his own observation when out hunting with his hawks. His falconer had let off a two-year old tiercel at some partridges, when a wild peregrine made its appearance, intending, no doubt, to secure one of the birds. As soon as the tiercel had struck his prey to the ground, the wild bird singled out another of the partridges, clutching it in the air, and was carrying it off triumphantly, when Mr Ewen's bird caught sight of the stranger, and at once gave chase, causing it to drop the partridge; the tiercel then pounced upon the falling bird, and caught it before it reached the ground.

THE MERLIN (*Falco æsalon*).

Found in both counties, but is less common in Wigtownshire. Even in Ayrshire it appears to be in a measure restricted to the moors facing the sea. Its favourite prey is the snipe; it also kills dunlins, dotterel, and other shore birds. In the cultivated parts of our district, and also those of Kirkcudbrightshire, it is only a winter visitant.

A very beautiful adult male, measuring not more than nine inches in length, was shot on the farm of Drummuck, near Girvan, in the summer of 1869.

OBS.—The Hobby (*Falco subbuteo*) has occurred several times in the south of Scotland, viz., in Dumfriesshire, Roxburghshire, and Kirkcudbrightshire. In the last named county, Mr Tottenham Lee procured two specimens, and saw a third.

THE KESTREL (*Falco tinnunculus*).

Common. A favourite resort for this species is the line of cliffs between Lendalfoot and Ballantrae, where we have seen many nests comparatively easy of access. Several pairs breed on the cliffs at the Mull of Galloway. The kestrel is quite harmless as a bird of prey to the game preserver, feeding on moths, beetles, and even worms. We have seen it in small groups on the public road near the edge of the cliffs referred to, apparently on the look-out for *Geotrupes stercorarius* burrowing in its favourite mounds. The kestrel appears to live on good terms with the starling and jackdaw, both of which are its daily associates during the breeding season.

THE SPARROW-HAWK (*Accipiter nisus*).

Of frequent occurrence, and much persecuted on account of its destructive ravages among game and poultry, keepers and farmers alike waging war against it. Its partiality for barn-door chickens and partridges has given the bird a bad name, and, indeed, its thefts are offences not easily overlooked. It breeds on the cliffs at the Mull of Galloway, but is perhaps better known as a native of old plantations, where it frequently makes use of the deserted nests of other birds.

OBS.—The Goshawk (*Astur palumbarius*) has been observed repeatedly in Kirkcudbrightshire by Mr Tottenham Lee, who found its nest in at least two instances. See *Naturalist* for 1853, vol. iii., p. 45; also Mr A. G. More's paper in the *Ibis* for 1865.

THE KITE (*Milvus vulgaris*).

Formerly bred in Glen App, a beautiful district in the south of Ayrshire, but it is now doubtful if even a stray bird is at any time visible. This fine species appears to be more sensitive to persecution than other birds of prey, judging from the very rapid diminution of its numbers throughout Scotland during the last twenty years.

Mr Gray lately examined a beautiful specimen shot near Beith many years ago. It is now never seen there.

THE COMMON BUZZARD (*Buteo vulgaris*).

Very uncommon, having doubtless yielded to the wide-spread persecution which has been practised since the excessive protection of game became common. In the upland ranges of both counties the nest is sometimes found. Specimens of both young and old birds are occasionally taken to Newton-Stewart from the neighbourhood of Loch Trool—a charming bit of scenery about sixteen miles north-east of that town. Mr Gray lately examined a specimen of this buzzard shot near New Cumnock.

THE HONEY BUZZARD (*Pernis apivorus*).

A young male bird of this species was shot on 21st September, 1864, at Wellwood, near Muirkirk, Ayrshire. It had been seen in the neighbourhood previously, and the keeper who shot it states that he trapped a bird of the same species in September, 1863, but that it broke away on his approach, leaving part of one of its legs in the trap.

OBS.—The Rough-legged Buzzard (*Buteo lagopus*) has occurred in Lanarkshire on the confines of our district, but not, so far as we are aware, within the limits we have prescribed for ourselves.

THE HEN HARRIER (*Circus cyaneus*).

Even of greater rarity than the preceding. A solitary pair may yet be seen frequenting some of the wilder moors of Wigtownshire, but so soon as their whereabouts is discovered, means are used for their destruction. The conspicuous appearance of the male bird against the brown heath, especially during flight, has no doubt tended to the discovery of the nest, and consequent capture of both birds. Keepers, on finding a nest, usually wait until the eggs are hatched, and are in the habit of killing all the young birds except one, which they fasten by the leg to a stake, and thus oblige to remain there, even after being fully fledged until an opportunity occurs for shooting the old birds. This is sometimes but too easily accomplished, as they continue bringing prey to the tethered captive long after it should have been hunting the moors on its own account. From a published list of "vermin" destroyed by Lord Ailsa's keepers, within a limited area, between 25th June, 1850, and 25th November, 1854, we find that 310 "ash-coloured hawks" were killed in that interval.*

MONTAGU'S HARRIER (*Circus Montugui*).

Our only authority for recording this species is a notice by the late Mr Thompson in his "Birds of Ireland," vol. i., p. 83, where it is stated that a specimen—a male bird—was shot on a moor near Ballantrae in 1836.

STRIGIDÆ.

THE LONG-EARED OWL (*Otus vulgaris*).

Sparingly distributed in Ayrshire, and some parts of Wigtownshire, frequenting fir woods, especially where the trees are of some age. As a rule, this species is characteristic of the eastern side of Scotland.

THE SHORT-EARED OWL (*Otus brachyotos*).

Well known in the higher grounds, where it probably breeds, although we have not heard of any authentic discovery of its nest of late years. It formerly bred on the moors above Portpatrick. This bird occasionally takes voluntary flights by day, and appears to hunt over turnip and potato fields in quest of field mice, thus proving itself a useful friend to the farmer.

THE WHITE OR BARN OWL (*Strix flammea*).

This beautiful owl is not uncommon, taking up its abode in ruined castles, which are numerously scattered throughout Ayrshire. Some of these ruins are situated in very romantic places on the borders of desolate moors, and the banks of fertile glens, where the bird is alike at home, trusting to the nearest clachan or homestead for a sufficient supply of its favourite prey.

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* To show the ignorant and indiscriminate nature of the slaughter referred to, we may state that the list likewise includes thirty-three "Fern Owls," catalogued as offenders, with Brown Owls, Horned Owls, and Barn Owls—all innocent of the destructive propensities ascribed to them. Making the usual allowance for the proverbial diligence of keepers in general, we cannot but regard the destruction of the poor Nightjar as the result of a melancholy, but fortunately unusual, ignorance of the bird's habits.

THE TAWNY OWL (*Syrnium stridula*).

Frequently obtained. It seems to prefer woods where the trees are of some height, but its nest is seldom more than a few feet from the ground. It is merely a handful of withered leaves laid in a cavity where the larger branches diverge from the main trunk. The tawny owl is often procured by parties practising shooting at rooks. We have long noticed the partiality of this owl for rookeries.

THE SNOWY OWL (*Surnia nyctea*).

A splendid male bird of this species was shot near Kilmarnock in February, 1863, and exhibited by Dr Colquhoun at a meeting of the Natural History Society of Glasgow. It may not be out of place to state that two other examples of the snowy owl occurred in the Firth of Clyde about the same time. One of these, captured near Greenock, is now in the collection of Mr W. C. Angus, Aberdeen.

OBS.—The Hawk Owl (*Surnia funerea*), having twice occurred near the Clyde estuary, is likely to be met with accidentally in our district. Examples of this bird, no doubt, find their way to the shores of Scotland by means of Clyde ships, on which they alight when at a considerable distance from land, and remain until nearing the coast.

INSESSORES.

DENTIROSTRES *LANIADÆ.*

GREAT GREY SHRIKE (*Lanius excubitor*).

It is only of late years that the grey shrike has appeared in our district, or indeed in any part of the West of Scotland. Mr Oliver Eaton, bird preserver, Kilmarnock, has informed us that he preserved a specimen which was shot on the Kilkerran estate on 10th December, 1868, by George Blacklaw, gamekeeper there, and Mr Gray has examined two which were obtained near Kilbirnie in 1863. It has likewise been shot in Renfrewshire on one or two occasions. This species is now a regular winter visitant to the eastern counties of Scotland.

MUSCICAPIDÆ.

THE SPOTTED FLYCATCHER (*Muscicapa grisola*).

A quiet and unobtrusive species, generally distributed. It builds in gardens, sometimes close to dwelling-houses; at other times in rocky niches, and on the main stems of trees at a distance from such habitations. It feeds upon various insects, including moths and butterflies, and is fond of a conspicuous perch from which it can easily detect its passing prey.

MERULIDÆ.

THE COMMON DIPPER (*Cinclus aquaticus*).

Very common on most of the rivers and streams of both counties, on the banks of which it breeds in various situations. We have seen its nest on inaccessible walls of rock, underneath bridges, in abrupt banks, on moss-covered rocky boulders, and in holes of trees. In severe winters the families of the previous summer appear to re-assemble, and forage together at open pools. We have noticed as many as five perched on the ice, and diving into holes broken by ourselves to admit of their access to the water. One of these birds frequented for some months the beams of a wooden bridge thrown across the water of Girvan at Enoch farm. It roosted every night in the same spot, and its first act in the morning was to take a "header" into the stream, and re-appear at a little distance from the bridge, after which it flew off to its ordinary haunts.

THE MISSEL THRUSH (*Turdus viscivorus*).

Now tolerably common, although a somewhat rare bird thirty years ago. Flocks of ten or twelve assemble in autumn, and frequent the fields about the time the crops are gathered. They seem partial to potato lands. It is now a very common species in the neighbourhood of Girvan. We observed about twenty feeding daily on Knock-a-vallie, near the shore, in June, 1869.

THE FIELDFARE (*Turdus pilaris*).

A familiar winter visitant, resorting to the coast line in hard weather, where it turns over the rejectamenta left by the tides in search of larvæ, etc.

THE SONG THRUSH (*Turdus musicus*).

Generally distributed. Near Girvan it resorts, during the autumn months, to the sea-shore, frequenting pasture lands in the immediate vicinity, and feeding on a small species of *helix* conspicuously plentiful at that season. It breeds upon Ailsa Craig, where its song may be heard strangely in contrast to the other sounds of various quality to be heard on that lonely rock.

THE REDWING (*Turdus iliacus*).

A winter visitant, appearing about the same time as the Fieldfare, and associating with it in its shore haunts.

THE BLACKBIRD (*Turdus merula*).

Abundant. Between Girvan and Ballantrae numbers of these birds may be seen, after the breeding time is past, frequenting the beach, and seeking refuge on hot days below the rocky boulders. We have ejected as many as fifteen and eighteen blackbirds from underneath one rock. This species is found on Ailsa Craig, where it breeds. Dr Anderson found a nest with five eggs built in one of the turret holes of the old castle a few years ago.

THE RING OUZEL (*Turdus torquatus*).

A very common species on many of the wildest moorland tracts of Ayrshire, but much less common in Wigtownshire, as far as our own observations enable us to judge. Mr Anderson has observed it frequenting his garden at Girvan late in autumn. This species migrates southward as winter approaches. Mr M'Donald, one of the keepers at the Mull of Galloway lighthouse, captures an occasional specimen on the lantern about the time the flocks are quitting Scotland.

SYLVIDÆ.

THE HEDGE ACCENTOR (*Accentor modularis*).

The confiding Shufflewing is everywhere known. It lives upon Ailsa Craig, among the kittiwakes and guillemots, and jerks about among the rugged stones as contentedly as if in the near neighbourhood of a stack yard.

THE REDBREAST (*Erythaca rubecula*).

Abundant. A fine specimen with a pure white head was shot by Mr Anderson at Girvan, about three years ago, and is now in Mr Gray's collection.

THE REDSTART (*Phœnicura ruticilla*).

Not common. It is, indeed, even rare in some parts of Ayrshire. Mr Oliver Eaton, during a long experience as a bird preserver at Kilmarnock, mentions that he has only had one specimen through his hands; it was shot by himself, at a coal pit at the Grange, in the end of October, and had been seen there two weeks previously. It frequents sheep-farm steadings in retired upland districts, and is often found at an elevation of 1,500 feet above the sea level.

THE STONECHAT (*Saxicola rubicola*).

This lively bird is very abundant on the coast line extending from Ayr to Burrow Head, with the exception of spots here and there where the cliffs are of great height. In sheltered recesses, however, where a breach in the cliffs occurs and vegetation gets a hold, the Stonechat is sure to be there, perching on weeds and bramble stems, and uttering his monotonous "*chuck-chuck*" as he turns round to look at the intruder.

THE WHINCHAT (*Saxicola rubetra*).

Not nearly so common as the preceding species, but nevertheless occurring in considerable numbers. It is seen mostly in pairs, and often draws attention to its movements by its habit of fluttering over a particular spot, and snapping at insects while at rest on grassy stems, etc.

THE WHEATEAR (*Saxicola œnanthe*).

Very common. On Ailsa Craig it is also numerous, frequenting the summit of the island, where it breeds in crevices and rabbit holes. It sometimes lingers till October, both on the shore and on the upland sheep pastures.

THE GRASSHOPPER WARBLER (*Salicaria locustella*).

This warbler is very common in the neighbourhood of Kilmarnock. Mr Gray having recently observed this species in the collection of Mr Eaton, bird preserver there, made inquiries as to the localities frequented by the bird, and was informed by that diligent collector that he had been familiar with it for the last nineteen years. "Almost all the young plantations," writes Mr Eaton, "are frequented by a pair; they arrive with our other summer visitors." We are also satisfied of the species being a native of Wigtownshire. It is stated in a communication by the late Rev. Thomas B. Bell, published in the Proceedings of the Royal Physical Society of Edinburgh, that it breeds in the parish of Leswalt in that county. We took notice of this interesting species near Girvan in the beginning of July, 1869.

THE SEDGE WARBLER (*Salicaria phragmitis*).

One of the commonest warblers in Ayrshire, and, so far as we can judge, a common species also in Wigtownshire. It is a very conspicuous bird on the banks of the Water of Girvan, where its unceasing mirth is sure to attract the most careless observer. It breeds in some numbers on the farm of Enoch, near Girvan, and is also very common near the curling pond. We have often observed this bird singing while on wing mounting into the air, and descending again with jerks to the hedge or growing grain from which it rose.

THE BLACKCAP WARBLER (*Curruca atricapilla*).

Wherever a soft, sylvan spot occurs throughout our district, the blackcap is a well-known element in the bird life of the locality. Being, in appearance at least, a firmly-built and hard-billed warbler, it might be expected to combat the rigours of a blustering autumn or early winter; hence we find that even when the woods are fast losing their tints, and all other warblers are gone, the blackcap lingers in young plantations and orchards, garden plots and sheltered nooks, feeding upon small fruits and insect prey, in searching for which it exhibits great restlessness. It may at these times be heard uttering a hard but clear note, reminding the observer of the habits of some of the larger Tits.

THE GARDEN WARBLER (*Curruca hortensis*).

Found sparingly in cultivated districts, chiefly frequenting orchards and cottage gardens, and taking up its perch regularly on some old apple tree, from the top branches of which it may be seen, morning and evening, pouring out its rich notes, to the delight of the listener. The song of this warbler, indeed, is only surpassed by that of the nightingale. It is, however, of comparatively short duration, as the bird becomes silent when the first brood is hatched, and is only heard for a little while should a second nest be built.

THE COMMON WHITETHROAT (*Curruca cinerea*).

Very commonly distributed, arriving early in May, and enlivening almost every hedge-row in the two counties. It sometimes rears two broods, the nest being placed in tufts of coarse grass, bramble or briar thickets, or among rank plants near the base of a hedge. These birds arrive in full plumage, and are for a time very diverting from their liveliness and loquacity. As the season advances, however, the feathers become faded and worn, and the birds quit our coasts in a costume so ragged as to cause one to wonder how the little fellows, imperfectly clad as they are, can undertake the fatiguing journey they have in prospect. We have seen this warbler continually haunting the grassy patches occurring on the coast line between Girvan and Lendalfoot, where one would little expect to find a bird of sylvan habits.

THE LESSER WHITETHROAT (*Curruca sylviella*).

Sparingly met with, and much less obtrusive in its habits than the preceding species. This warbler was well known as an Ayrshire bird thirty years ago. We are not, however, certain of its being a native of Wigtownshire.

THE WOOD WARBLER (*Sylvia sylvicola*).

A well-known, though not abundant, summer visitant to both counties. Being much quieter in its habits than the next species, it is not so often observed, although of brighter tints. It is also later in making its appearance, and in consequence not so easily perceived among the dense foliage of the trees which it frequents.

THE WILLOW WARBLER (*Sylvia trochilus*).

This welcome little summer bird is very common, arriving some seasons about the middle of April. It visits the glens in both counties extending to some height above the sea level, and remains there during the season, building its nest in heathery tufts, and lining it with game bird feathers. We have heard this species singing blythely in the middle of July.

THE CHIFF CHAFF (*Sylvia rufa*).

Of much rarer occurrence with us than the preceding species. We have identified it near Girvan, both on its arrival and previous to its departure. It prolongs its stay until the beginning of October, and may be then observed flitting anxiously among the birch and alder trees in some of the glens, uttering a cheeping note, and sallying out after passing insects.

THE GOLDEN-CRESTED WREN (*Regulus cristatus*).

Common. Great numbers are seen late in autumn frequenting fir woods in the south of Wigtownshire. They are apparently congregations assembling before migrating southwards. Mr M'Donald, light-keeper at the Mull of Galloway, informs us that he captures quantities of these little creatures in the lantern about that season, and also again in spring when they return.

PARIDÆ.

THE GREAT TIT (*Parus major*).

Tolerably common, and extremely restless in its habits, seldom remaining above a few minutes in one place. It often breeds in holes of walls, and sometimes in straw stacks. Old birds and young broods appear in gardens in July.

THE BLUE TIT (*Parus cœruleus*).

Very common; travelling in lively companies from place to place in the autumn and winter months. The nest is frequently found in gardens, placed generally in any suitable crevice in an old wall or hollow tree. It is a vigorous little bird in defence of its young.

THE COLE TIT (*Parus ater*).

Common in woods and belts of plantations. In the winter season it takes up its quarters in private policies, where the woods are old, and finds plenty of sustenance on the old trees infested with insects. We have often seen it hopping among the withered leaves on the ground, which it diligently turns over in search of prey.

OBS.—The Marsh Tit (*Parus palustris*), although known to occur in Renfrewshire and Lanarkshire, has not yet come under our notice in our own district. It will, no doubt, however, be found in both counties.

The Long-tailed Tit (*Parus caudatus*).

Common, frequenting woods and hedge-rows. Very conspicuous in autumn and the beginning of winter, when they assemble in troops and travel long distances in company.

AMPELIDÆ.

The Bohemian Waxwing.

Has occurred in Wigtownshire. A specimen seen and examined by Mr Gray was taken alive at Portpatrick in the winter of 1866. As a rule, this species is but seldom met with in the western counties of Scotland.

MOTACILLIDÆ.

The Pied Wagtail (*Motacilla Yarrellii*).

Very generally distributed. Large flocks gather in some of the shore districts of both counties, preparatory to a general migration. Great numbers of these birds roost in alder bushes growing upon the banks of the Girvan Water throughout the month of September. They come in at nightfall from all parts, and assemble in clusters, taking up their perches five or six on a branch. As many as thirty or forty may on these occasions be dislodged from one bush. After rain, they sally forth in companies in the morning to the nearest grass park, where they diligently devour the smaller larvæ and insects that may have been disturbed by the shower.

The Grey Wagtail (*Motacilla boarula*).

Permanently resident. It is found on the high lands as well as the low grounds, and is very partial to clear, running water, frequenting alike the margins of drains, brooks, rivers, and ditches. The situation of the nest varies according to circumstances. It is found under bridges, in holes of walls and tree roots, sometimes within reach of a flood, and there are two broods in the year. We have seen as many as seven or eight of these beautiful wagtails in Girvan Harbour at low tide, and in August, 1869, we took notice of an equal number together at once in the stony bed of the Stinchar, near Daljerrock.

RAY'S WAGTAIL (*Motacilla Rayi*).

A common summer visitant, and found distributed in pairs throughout our district. We have seen it frequenting the pebbly bed of the Girvan at mid-day throughout the summer months. In the month of July, but more especially in autumn, we have repeatedly observed it on the sea-shore, generally at the mouth of a small rivulet. The plumage of the bird has then lost its lustre, and the bright yellow of the spring dress has entirely disappeared.

ANTHIDÆ.

THE TREE PIPIT (*Anthus arboreus*).

Found breeding near Girvan. Several pairs may be seen throughout the summer frequenting the outskirts of Killoop Wood. It is also met with at Braehill, and other localities in the district.

THE MEADOW PIPIT (*Anthus pratensis*).

There appears to be a partial migration of this species southwards in autumn, many flocks at that season descending from the higher grounds to the fields skirting the shore. These congregations disappear, and come back in the following spring. The meadow pipit, like some of the buntings and warblers, looks much altered about the close of autumn when the plumage becomes faded.

THE ROCK PIPIT (*Anthus petrosus*).

Strictly confined to the sea-shore, where it appears to be uniformly distributed from Ayr to the Mull of Galloway. In some places where the shore is flat it constructs its nest among the rough stones beyond high water mark, and at the line where tufts of grass appear in summer time. In rocky situations it is placed in crevices, sometimes at a considerable height in the front of the precipice. We have taken it in exceedingly picturesque spots on the line of rocks near Carleton Fishery—the nest being often placed under a tuft of wild roses or other flowers, and completely screened from observation.

ALAUDIDÆ.

THE SKY-LARK (*Alauda arvensis*).

The familiar laverock is abundantly distributed. Some winters ago immense flocks of larks appeared during hard weather in some fields close to the town of Girvan. On rising from the ground, the cloud of birds appeared so dense as to obscure objects in the line of their flight. Large numbers were killed on the telegraph wires, and after the flocks passed it was found that many birds had been mutilated, their wings being torn off by the wires.

THE WOOD-LARK (*Alauda arborea*).

The late Rev. Dr Landsborough informed Mr Gray that he had found this species at Stevenston. It has never come directly under our own observation. Various records of its existence as a familiar Scottish species have from time to time been published, but many of these, it is to be feared, refer to some other bird. The wood-lark, however, has certainly been found in many parts of Scotland, satisfactory instances of which are given in Mr Gray's "Birds of the West of Scotland,"* etc.

EMBERIZIDÆ.

THE SNOW BUNTING (*Plectrophanes nivalis*).

A winter visitant only, occurring at times in solitary specimens along the coast. As a rule, it is much commoner on the shores of the east of Scotland. In April and May the birds assume the breeding plumage, which in the male contrasts strikingly with the sober tints of the hill sides, where small flocks are seen flitting in advance of any intruder on their haunts.

THE COMMON BUNTING (*Emberiza miliaria*).

Very abundant in both counties, especially near the coast between Girvan and the borders of Kirkcudbrightshire. Mr Gray has observed it to be particularly common in the southern districts of Wigtownshire, where the pasture lands are irregularly broken with protruding masses of rock.

THE BLACK-HEADED BUNTING (*Emberiza schœniculus*).

Common, and generally distributed. It breeds in some numbers in the neighbourhood of Girvan. In a nest taken by Mr Anderson one of the eggs was not much larger than a pea. It is permanently resident, and, so far as we can learn, there are no winter flocks in our district from other quarters.

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* In the press, and will shortly be published.

THE YELLOW BUNTING, or YELLOW HAMMER (*Emberiza citrinella*).

This bunting is very common in all the lower grounds under cultivation. During the warm season of 1868 it appeared to be unusually abundant in Wigtownshire, and attracted notice by its assembling on the public roads during the excessive heat. They seemed to be the only birds visible, and harmonised curiously with the golden tints pervading all surrounding objects.

FRINGILLIDÆ.

THE CHAFFINCH (*Fringilla cœlebs*).

Very common everywhere, and a familiar visitant to farm-steadings even when situated in moorland localities. Mr Anderson found a nest of this species built on the top of a wall at Enoch Farm, beside a bit of turf. Two other nests were situated in a tree only a few feet from the spot. A tame Chaffinch at Penkill Castle lived in confinement upwards of seventeen years; it was taken from the nest, and carefully supplied with insect food, which doubtlessly accounts for its prolonged life in captivity.

THE MOUNTAIN FINCH, or BRAMBLING (*Fringilla montifringilla*).

A regular winter visitant, but only in small numbers, except in unusually severe weather. It then appears at farm-steadings, mixing with sparrows, chaffinches, yellow hammers, and green linnets; and is often caught by country boys, who cage their captives in triumph, as the *Cock o' the North.*

THE HOUSE SPARROW (*Passer domesticus*).

Extremely common. A colony of these birds have taken possession of a number of holes in a broken embankment above a deep pool in the Water of Girvan on Enoch Farm. Dr Anderson turned out many of their nests containing eggs; these had been placed on beds of material laid there by a colony of sand martins, the original owners of the holes. Frequent battles were fought by the martins and sparrows for possession, and these were in one or two cases settled by the two species sharing a hole between them—the martins' nests being placed at the very extremity of the hole, and the sparrows' about midway from the entrance.

Mr Gray has examined two cream-coloured varieties of this species in the possession of Mr John Jamieson, Ardrossan.

THE GREENFINCH (*Coccothraustes chloris*).

Permanently resident, and generally distributed. During the autumn months very large flocks of these birds congregate in fields adjoining the sea-coast, and feed upon the seeds of various plants, also upon left grain. Swarms of them are seen on the mounds of chaff visible here and there along the shore, the record of visits of itinerant threshing machines. Sparrow-hawks and other birds of prey often stoop into the midst of these multitudes, and carry a bird to the nearest rock, where it is plucked and devoured. During this process the linnets re-assemble on the chaff, and are again pounced upon, the hawk, in this second instance, flying off to a distance with his victim.

Mr Eaton has in his possession a specimen of the green-linnet of a pure bright yellow, with the quill feathers entirely white.

THE GOLDFINCH (*Carduelis elegans*).

There can be no doubt that the great improvements effected in the agriculture of the two counties have materially lessened the number of goldfinches throughout the country. Its favourite food is the seed of plants now carefully destroyed by the husbandman, so that the bird's haunts are, for the most part, now confined to glens penetrating some distance into the uplands, where these plants are yet tolerated, or where their growth is not a hindrance to profitable farming.

THE SISKIN (*Carduelis spinus*).

Although we have not yet taken the nest of this bird in either of the counties, we are inclined to think it may yet be found. It breeds in the adjoining county of Kirkcudbright. Siskins are captured by the country bird catchers in small numbers, chiefly during the autumn season. As a rule, these birds are much commoner in the eastern counties.

THE COMMON LINNET (*Linota cannabina*).

Common throughout the district. "In some parts of Ayrshire linnets are gregarious to some extent, even in the breeding season, both on the sea-shore and in the pebbly beds of rivers and smaller streams, which they frequent at certain hours, coming and going together in flocks with apparent regularity." See "Birds of the West of Scotland."

THE MEALY REDPOLE (*Linota canescens*).

This species, occurring, as it does, frequently in Kirkcudbrightshire, may also occur in our district in some numbers. At present, however, we can only record with certainty a single example: it was shot at Caperton, near Kilmarnock, in April, 1864, and is now in the possession of Mr Eaton, bird preserver. We may state that, in the same year, many specimens were taken in the south of Scotland.

THE LESSER REDPOLE (*Linota linaria*).

This interesting and familiar bird is sparingly distributed in localities suited to its habits. It breeds in both counties, and in Renfrewshire and Dumfriesshire. The habits of the lesser redpole may be easily studied, as it is exceedingly tame, and heedless of observation.

THE MOUNTAIN LINNET, or TWITE (*Linota montium*).

This, the "heather lintie" of most rural districts, is generally distributed, frequenting chiefly the higher grounds beyond the limits of high cultivation. It is a much more plentiful species in the western counties than those of the east of Scotland. Mr Gray has given an account of its habits, as observed by himself in the Outer Hebrides, where it is extremely numerous. See "Birds of the West of Scotland."

THE BULLFINCH (*Pyrrhula vulgaris*).

Is found in considerable numbers throughout Ayrshire. It is nowhere more plentiful than in some of the glens within a few miles of Girvan, where groups of five or six may be heard piping from the alder thickets after the young are fledged. We have observed it to be particularly common on the farm of Drummuck, in the parish of Dailly; indeed, the whole of the valley of Girvan seems peculiarly attractive to the species.

THE COMMON CROSSBILL (*Loxia curvirostra*).

A yearly visitant, and probably a permanent resident in some places. It breeds in the woods on Drummuck farm, the nest having been found there as late as May—probably a second brood. We have seen specimens of the bird that were killed there at that season. In the adjoining county of Kirkcudbrightshire the crossbill is equally well known; and a record dated as far back as 1792 states that it then was known to breed in the parish of Buittle. Mr Gray has been informed by a gentleman well acquainted with birds, that he has every reason to believe that it breeds there still.

THE PARROT CROSSBILL (*Loxia pityopsittacus*).

This rare species has been obtained on the confines of Ayrshire, a specimen having been killed at Wemyss Bay in the spring of 1862, as recorded in "Birds of the West of Scotland."

STURNIDÆ.

THE COMMON STARLING (*Sturnus vulgaris*).

Has become very common of late years, chiefly owing to the protection afforded it. It appears to have spread itself in all quarters, although thirty years ago it was comparatively rare. This bird seems partial to the sea-shore during the winter season.

CORVIDÆ.

• THE CHOUGH (*Fregilus graculus*).

Inhabits the cliffs near Ballantrae, also the Mull of Galloway and Burrow Head. Its numbers of late years, however, have become greatly reduced. Mr Gray has visited its haunts repeatedly for the express object of seeing the birds, but has almost invariably been disappointed. One was shot near Burrow Head in the beginning of November, 1868. Along the shores of the southern part of Kirkcudbrightshire it occurs in small flocks; and Mr Gray has been informed by Mr Watson, Stranraer, that he has seen it frequently, during the last few years, in the parish of Kirkmaiden. Mr M'Donald, of the Mull of Galloway lighthouse, states his opinion, that in his neighbourhood the chough was much oftener seen some years ago than it is now; indeed, he believes that at present there are only one or two pairs. The Rev. Thomas B. Bell of Leswalt, Wigtownshire, in a communication made some years ago to the Royal Physical Society of Edinburgh, says that the chough "annoys the farmers by digging up the sprouting wheat and tearing off the roofs of their stacks."

The Raven (*Corvus corax*).

Now greatly thinned, being greatly and justly disliked by the sheep farmer, on whose lands it commits its worst depredations. Notwithstanding the rigorous persecution to which it is subjected, the raven seems even yet in less danger of total extirpation than many other birds whose lives are in constant danger. The best time to shoot the vagabond is at dusk, when he and his mate are returning from a day's foray to their favourite roosting place. The following lines are taken from an address to the bird, probably written by some half-poetical and watchful keeper, in the prospect of a revengeful shot:—

"Say, weary bird, whose level flight,
Thus, at the dusky hour of night,
Wends through the midway air—
Why yet beyond the verge of day
Is lengthened out thy dark delay,
Adding another to the hours of care?"

The Carrion Crow (*Corvus corone*).

Not common, but seen occasionally in autumn frequenting the sea-shore, sometimes in company with the Hooded Crow. *Hoody Craw* is the name given to this bird in most parts of Scotland.

The Hooded Crow (*Corvus cornix*).

About equal in numbers with the preceding bird, but both are well kept down by the game preservers. As the two birds are perfectly identical in form, size, habits, and general mode of living, and are *known to breed freely together* in the middle districts of Scotland, it is difficult to believe in any specific distinction between them. The grey-backed bird is believed by Mr Gray to belong to a northern race of the carrion crow, and it has been ascertained that the boundary line where the two unite stretches from Argyleshire through Perthshire and Forfarshire. In the Outer Hebrides the grey markings become permanent. See "Birds of the West of Scotland," where the question of unity is more fully dwelt upon.

THE ROOK (*Corvus frugilegus*).

Abundant. Recent discussions in agricultural quarters have placed this bird in a somewhat doubtful position. That rooks commit mischief cannot, we think, be called in question; but that they also do great service, in devouring noxious larvæ and other farm insect-pests, is equally true. The question is, on which side does their daily habit preponderate? The following fact, communicated to an Edinburgh newspaper during a late controversy on this point, seems to show that their appearance on newly-sown fields is not necessarily associated with bird damages:—"I put a boy," says the writer, "to keep them off a field of six acres sown with wheat in October. The season was wet and cold, so the boy got under a tree in the corner, made his little fire, and enjoyed himself. So did the rooks on every part of the field except that within stone-throw of the corner. In this portion of the field the wheat was wretched; but wherever the rooks had eaten up the slug or the wire-worm, the crop was plentiful."

THE JACKDAW (*Corvus monedula*).

Very abundant in both counties, frequenting old castles, rookeries, and rocky headlands, such as the Mull of Galloway and Burrow Head. In both the last-named localities it is feared that it has been the means of nearly exterminating the chough. Dr Anderson shot a specimen which had its mandibles crossed like those of a *loxia*. The bird is now in the University Museum, Glasgow.

THE MAGPIE (*Pica caudata*).

This beautiful bird has of late years been very much shot down in game-preserving quarters. We were lately interested in observing as many as twelve or fourteen magpies, on the farm of Littleton, near Girvan, where no keeper had been employed for some years. These birds kept strictly within the limits of their asylum. We have been informed, however, that a few weeks ago the keeper on the surrounding estate (Culzean), invaded their sanctuary, and shot several birds after having destroyed the nests.

THE JAY (*Garrulus glandarius*).

Even less numerous than the magpie, although rivalling it in beauty of plumage. Its thievish habits form the universal apology for its destruction; but no sensible ornithologist, we think, would object to a few jays being left to enliven and beautify our woods.

INSESSORES.
SCANSORES. *PICIDÆ.*

GREAT SPOTTED WOODPECKER (*Picus major*).

This Woodpecker, which of late years has become rather a common winter visitant to the eastern districts of Scotland, has been obtained several times in Ayrshire, and once on the outskirts of the county. One was shot at Cumnock; another at Fullarton, near Troon, on 2d November, 1868; and a third, about five weeks later, near Ayr. For these notices we are indebted to Mr Oliver Eaton, bird preserver, Kilmarnock. A specimen was shot at Inverkip, Renfrewshire, in October of the same year. This locality is very close to the boundary of our district.

CERTHIADÆ.

THE COMMON CREEPER (*Certhia familiaris*).

Well known in both counties, and permanently resident in woods and patches of plantation attractive to a bird of its habits.

THE WREN (*Troglodytes vulgaris*).

Common everywhere. It frequents Ailsa Craig, where it apparently remains all the year. Great numbers of winter nests are found underneath the abrupt banks of the water of Girvan. These structures are of small size, and without any lining.

There is a cream-coloured variety of this bird in the collection of Mr Eaton, Kilmarnock. It was shot near that town.

THE HOOPOE (*Upupa epops*).

Mr Yarrell states, in his "British Birds," that a specimen of the hoopoe was killed in Ayrshire, without, however, specifying any particular locality. This record probably refers to a specimen shot near Coylton, in Ayrshire, on 16th October, 1836—an occurrence which is noted in the "Magazine of Geology and Botany," Vol. I., page 491, on the authority of Mr P. W. Maclagan.

Mr Gray was lately informed by Mr Stewart of Tonderghie, Wigtownshire, that one of these birds frequented his policies in 1862 for about ten days, and was frequently seen near the house. It has once occurred in Renfrewshire—a specimen having been shot near Port-Glasgow in October, 1863.

CUCULIDÆ.

THE COMMON CUCKOO (*Cuculus canorus*).

Very common throughout the whole district. In passing northward it halts for a time on Ailsa Craig, and enlivens that isolated spot with its familiar salutation. These visits, however, are brief and uncertain. Mr Anderson has observed that all the specimens yearly killed by him immediately after their arrival appear to be in the moult.

INSESSORES.

FISSIROSTRES.

MEROPIDÆ.

THE ROLLER (*Coracias garrula*).

The late Dr Landsborough informed Mr Gray many years ago that a specimen of this rare bird was shot near Stevenston, in Ayrshire, about the year 1833. It has occurred in some of the neighbouring counties, but not elsewhere in our district.

THE BEE EATER (*Merops apiaster*).

In the summer of 1832 a bee eater was shot at Logan Garden, in the parish of Kirkmaiden, Wigtownshire. The species has occurred frequently in the eastern counties of Scotland, but is decidedly rare in the west.

HALCYONIDÆ.

THE KINGFISHER (*Alcedo ispida*).

The brilliant kingfisher is not uncommon on all our streams, preferring, however, those whose banks are clothed with birch and alder trees, or other overhanging bushes, in which it can perch and look out for prey. It breeds on the banks of the Stinchar and Girvan Water, and other picturesque streams, and delights the rambler in its romantic haunts as it whirrs past him when changing its pools. We have seen it fishing in company with the dipper in severe weather, when both were glad to avail themselves of an opening in the ice. On one occasion four or five dippers—probably a brood of the previous summer—had assembled at such an opening, and were perched in a half-circle, when a kingfisher, which had been sitting on a twig overhead, an unobserved "companion of the bath," flashed like an emerald into the water, and almost immediately reappeared with a minnow, which it battered on a little ice block, and then devoured. In this group of tiny plungers a beautiful grey wagtail sat in disconsolate silence, the whole of the birds forming a somewhat interesting winter assembly.

HIRUNDINIDÆ.

THE SWALLOW (*Hirundo rustica*).

Very common everywhere, extending to lonely and unfrequented shielings on the hill sides, and breeding in the rafters, or under bridges spanning moorland burns. Mr Anderson took a nest of this bird in an outhouse at Penkill farm, which was built on a tree branch hanging from the roof. This nest is now in Mr Gray's possession. It is composed of the usual materials, but is circular in shape, and profusely decorated with peacock's feathers. After the nest had been removed, the birds constructed another in a similar situation, and bedecked it in the same ornamental manner. A somewhat unusual site was selected by a pair of these birds this year at the Killochan Station, on the Maybole and Girvan Railway. The nest was built on the top ledge of a frame of an advertising placard, about eight or ten feet from the ground.

THE MARTIN (*Hirundo urbica*).

This familiar species is, as may be supposed, common over both counties, frequenting towns, villages, and farm-steadings. On some country mansions we have counted as many as eighteen and twenty nests built under the projecting eaves, and clustered, in some cases, closely together. A large colony frequents a part of the rocky cliffs near the port of Currarie, a few miles south of Ballantrae. Their nests are placed in fissures of the rock above the mouth of a large cave frequented by cormorants and rock-doves. In wild weather these nests are sometimes in danger of destruction by the masses of spray dashed over their surface.

THE SAND MARTIN (*Hirundo riparia*).

The haunts of this early summer visitant are met with in our district from the vicinity of the sea-shore to an elevation of ten or twelve hundred feet on the hills surrounding the moorlands of Ayrshire. It lives in colonies sometimes numbering twenty or thirty pairs, but is often found in single pairs in small quarries and abrupt river banks in retired places. We have seen their occupied burrows on the summit of Mulloch Hill and elsewhere, in the face of the little cuttings made by the road makers, and have watched them during our intervals of rest while exploring these places for Silurian fossils. In these upland haunts we have never found more than one pair inhabiting a quarry.

On the banks of the Water of Girvan, near Drumrannie, a numerous colony existed some years ago. Dr Anderson carefully examined upwards of a dozen of their burrows, most of which he found occupied by two pairs of birds, each passage branching into two about a foot from the outside. This particular bend of the river was frequented by the martins regularly for years, although every winter large masses of the banks were carried away by the floods. A few pairs still remain, and may be seen disputing the occupancy of the holes with a colony of impudent sparrows who lately took possession of them before the martins arrived.

Mr Gray has seen an albino of this species in the possession of Mr John Jamieson, Ardrossan.

THE COMMON SWIFT (*Cypselus apus*).

Extremely abundant. Towards the close of summer very large numbers congregate in the south of Wigtownshire, before finally quitting our shores.

The numerous old castles whose ruined towers are so conspicuous throughout Ayrshire, are all frequented by numbers of swifts, and occupied as nurseries during their brief summer stay. From these ancient ruins the birds take long excursions, especially in dull weather, returning to their cold and *eerie* quarters at nightfall. The eggs of this species are very difficult to procure, the nest being almost invariably placed in holes and crevices with an extremely small entrance. We have found a long tobacco pipe useful for extracting them from these cracks and fissures, but even with such an instrument there is always a risk of breakage, unless the eggs can be seen.

CAPRIMULGIDÆ.

THE NIGHTJAR (*Caprimulgus Europæus*).

Sparingly distributed, but nowhere numerous. It is, however, familiar enough to most collectors, and is a native of both counties. The nightjar is, perhaps, oftener recognised in its moorland quarters, from which it descends at the gloaming to the lower grounds in quest of moths and beetles, which we have seen it dexterously snapping from the surface of a grass field.

RASORES. *COLUMBIDÆ.*

THE RING DOVE, OR WOOD PIGEON (*Columba palumbus*).

Of late years this bird has become very numerous, and is now looked upon as a feathered nuisance throughout the agricultural counties of Scotland. In Ayrshire it has been for some years past a destructive farm pest, devouring the ripening wheat and other cereals in great quantities. In Wigtownshire, where turnips are cultivated to a large extent, it is equally mischievous, by eating up the tender blades, and destroying the growth of the bulb. It even picks up the sprouting seed of the turnip shortly after it has been sown; and as it feeds voraciously from early dawn to sunset, its depredations are not easily checked. Some years ago Mr Anderson found it a good plan to visit the turnip drills about sunrise, when the pigeons were found even at that hour dozing half-asleep, after an early breakfast, and, by taking them in a line, give them a good charge of No. 6 at fifteen yards. The ravages committed by wood pigeons in East Lothian have been met by a most extraordinary but unavailing slaughter of the birds on the part of the farmers of that district. This district is fully considered in the "Birds of the West of Scotland."

THE ROCK DOVE (*Columba livia*).

Plentiful along the coast between Ballantrae and the entrance to Loch Ryan, and also along the range of cliffs forming the Mull of Galloway. In these localities there is the usual admixture of the domestic breed, judging from the number of parti-coloured specimens noticeable in the flocks frequenting the line of caves on both Ayrshire and Galloway coasts. Last year we found a single pair breeding in the roof of a cave under the ruins of Turnberry Castle. A number of pairs frequent the caverns of Ailsa Craig.

Like the wood pigeon, this bird is occasionally destructive on farms in the vicinity of its haunts.

The Turtle Dove (*Columba turtur*).

Has occurred several times in Wigtownshire. The late Dr Landsborough mentioned to Mr Gray that a specimen was shot at Stevenston, Ayrshire, in 1834.

PHASIANIDÆ.

The Common Pheasant (*Phasianus colchicus*).

Abundant in all the preserves of both counties, and nowhere more numerous than in some parts of Ayrshire, where the protection of all kinds of game is encouraged to an injurious extent. In the preserves at Culzean Castle, and also on the estate of Kilkerran, there is a handsome breed frequenting the woods, viz., a cross between this species and Diard's pheasant (*P. versicolor*).

TETRAONIDÆ.

The Black Grouse (*Tetrao tetrix*).

This handsome species is very common on all the moors, especially those of the higher grounds of Ayrshire. In Wigtownshire it extends to the Mull of Galloway, and has been seen near the Lighthouse. It has also been found on the moors above Portpatrick, within sight of the Irish coast. Various attempts have been made to naturalise the species in Ireland, but without success.

A fresh egg of this bird was found about two years ago near the summit of Ailsa Craig, but it had probably been carried thither by some vagrant gull.

Mr Anderson has remarked, that in the neighbourhood of Girvan (Cuddystone Glen), he has seen young broods near cultivated fields, and at a long distance from the usual haunts of the old birds. In June, 1869, we sprung a grey hen in this locality, attended by a brood of seven healthy chicks.

Obs.—The Capercaillie (*Tetrao urogallus*) has, in one instance, been met with near Auchengray, in Lanarkshire, which is sufficiently close to our boundaries to merit remark. The specimen—a fine male bird in beautiful plumage—was shot by Henry Lees, Esq., in December, 1868.

The Red Grouse (*Lagopus Scoticus*).

Abundant on all the numerous shootings in both counties.

Very handsome birds are bred on some of the Ayrshire moors. The disease to which this fine bird, for the last twenty years, has been more or less subject, appears to be intimately associated with the destruction of birds of prey frequenting its haunts. (See "Proceedings," page 226).

THE COMMON PARTRIDGE (*Perdix cinerea*).

Also very common, and well distributed, extending in Wigtownshire to the verge of the cliffs at the Mull of Galloway Lighthouse, where we saw a covey last year in a small patch of oats in the enclosed piece of cultivated ground belonging to the Commissioners.

In ordinary seasons this bird is useful to farmers as a destroyer of *aphides* and other larger insects, which adhere to and injure the leaves of the turnip. Mr Anderson has seen a covey leisurely traversing the turnip drills, and picking the insects from the under side of the leaves; and we are gratified to learn from Mr J. A. Harvie Brown—an excellent observer, resident in Stirlingshire—that he has made similar observations on this habit of the partridge, during the present summer. "The *Green Fly*," writes Mr Brown, "is abundant on turnip leaves in some places this year, and the partridges seem to feed largely on it. I observed a covey, the other day, feeding along the edge of a turnip field, underneath the leaves; and Mr Drummond observed the same thing this year. I don't remember having actually seen them doing this before." A beautiful albino of this species was shot in Wigtownshire some years ago, by H. Stewart, Esq., of Tonderghie.

THE COMMON QUAIL (*Coturnix vulgaris*).

Well known both in Ayrshire and Wigtownshire. It is not uncommon near Girvan, frequenting grass fields, where, on summer nights, it is often detected by its soft and liquid note. Among rural people it is known by the name of *weet-my-feet,* these words being well expressed in the sounds emitted by the bird. Mr Gray has in his collection a specimen in summer plumage, shot near Kilmarnock, in May, 1868, by Mr Eaton, who states that it must breed somewhere in that neighbourhood. The nest has been frequently found in other parts of Ayrshire. Mr Gray has in his collection two very prettily marked eggs, taken along with other nine in a nest near Ardrossan, by Mr John Jamieson.

The nest was found by a party of mowers while at work in a rye-grass field. Quails were abundant in some districts of Wigtownshire about seventy or eighty years ago.

Obs.—It may here be remarked, that in the Statistical Account of the parish of Maybole, published in 1836, the Great Bustard (*Otis tarda*) is mentioned in a list of the birds of that district prepared by Dr M'Tyer. We have no means, however, of now proving the authenticity of this record.

GRALLATORES. *CHARADRIDÆ.*

The Golden Plover (*Charadrius pluvialis*).

Very abundant, and resident all the year, frequenting the moors in summer during the breeding season, and the sea-shore at low tide in winter. When the tide is full they repair to fallow grounds in the interior, sometimes travelling inland to a considerable distance. They seem to know instinctively at what hour to leave, so as to reach the coast when the rocks and sands are being exposed as the water recedes. On these occasions the flocks are immense, covering many acres of the shore, and sometimes packing so closely as to form a vast ornithological causeway. In the months of February and March, about the time when plovers partly assume their breeding plumage, Mr Anderson has seen flocks alighting in grass fields on Enoch Farm, and literally covering about eight or ten acres of ground. A noted haunt for this species in Ayrshire is the farm of Turnberry Warren, about five miles north of Girvan, where many thousands congregate in the pasture lands near the sea about the middle of July.

The Ringed Plover (*Charadrius hiaticula*).

One of the commonest shore birds from Ayr Heads to the Mull of Galloway wherever a stretch of sand occurs. Large migratory flocks appear to congregate on the shores of the Mull of Galloway in autumn. These flocks break up and disappear as winter approaches.

The Sanderling (*Calidris arenaria*).

About the beginning of August this species is found in considerable numbers on the shore near Girvan, but does not remain there longer than two or three weeks. We have repeatedly, and in some seasons invariably, found it in pairs, resting on the wet sand at low tide.

THE GREY PLOVER (*Squaterola cinerea*).

Very sparingly met with on the coasts. It appears to be much commoner in the eastern counties than with us.

THE LAPWING, OR PEEWIT (*Vanellus cristatus*).

Extremely common in the autumn months, congregating in pasture lands and the sea shore alternately. It disappears to a great extent in November, and returns in April, when the breeding haunts are occupied. They breed in communities of twenty or thirty pairs. In the last week of July, 1869, we observed a number of pairs of lapwings on the farm of Turnberry Warren, near Girvan, and being attracted by the behaviour of the birds as they plunged in the air while we drove past, we made a search in the field, and were surprised to find concealed among the rushes eight or ten broods in the down. These young birds were not more than ten days old. We have often observed this bird on moonlight evenings travelling in companies at a late hour, and at a considerable height in the air. Rural people in Ayrshire speak of the peesweep as a restless and "ill-conditioned brute." A properly seasoned dish of lapwings, however, about the close of autumn, when their flesh is really palatable, might help to dissipate this prejudice.

THE TURNSTONE (*Strepsilas interpres*).

Although the Turnstone cannot be called a common species in Ayrshire, it is never altogether absent. It is generally seen flying in flocks of five or six birds, and is somewhat restless in its habits, owing, probably, to the beach being unsuitable for a prolonged stay. Very fine specimens, nearly in the full breeding plumage, have been obtained by Mr Eaton at Ardrossan, where it appears to linger every year until May. In its winter dress it is common in some parts of Wigtownshire, such as the Bay of Wigtown, Garliestown Harbour, and the shores of Loch Ryan, etc.

THE OYSTER-CATCHER (*Hœmatopus ostralegus*).

Very common. On Fairlie Sands as many as fifty or sixty may be seen at a time, ranged along the oozy shores at low water. Southward on the Ayrshire coast, however, it becomes less numerous, and from Ayr to Ballantrae it occurs mostly in pairs, the small sandy bays offering but little temptation to a greater number to remain. In Loch Ryan, Wigtown Bay, and Garliestown, it again appears in abundance. We have seen flocks of twenty to thirty, flying at a great height, passing Girvan on their way to another feeding ground; and have counted, in the month of July, as many as sixty resting together on the sandy beach near Turnberry Castle.

ARDEIDÆ.

THE COMMON HERON (*Ardea cinerea*).

Common everywhere, from the sea-coast to the source of the moorland burn, many miles inland, and more than a thousand feet above the sea level. There are one or two heronries in Ayrshire. Towards nightfall, in the month of August, we have seen as many as six herons flying in company, and following the windings of the Water of Girvan, looking out for an attractive pool. They are at times very destructive to fish.

THE COMMON BITTERN (*Botaurus stellaris*).

Formerly bred in Bruntwood Loch, near Mauchline. This species is now, however, of very rare and uncertain occurrence in both counties. We have not, indeed, seen a recently killed specimen for some years.

THE NIGHT HERON (*Nycticorax Gardeni*).

Mr Eaton has informed us that a specimen of this heron was shot, many years ago, within a mile of Kilmarnock. We know of no other instance of its occurrence in any part of our district.

SCOLOPACIDÆ.

THE COMMON CURLEW (*Numenius arquata*).

The well-known whaup is very abundant, breeding on all the moors of both counties, and frequenting the entire coast line, at low water, from Fairlie banks to the shores of Kirkmaiden. When the young are fledged, and begin to congregate in autumn, they frequent pasture lands, and are then easily obtained, not having acquired the characteristic wariness of the old birds. We have seen them in July traversing the line of high water mark, and feeding upon sand hoppers, which at that season are exceedingly abundant; and in the same month immense flocks collect in the pasture lands of Turnberry Warren farm, from which they make daily visits to the beach. On 24th July, 1869, we noticed a flock in which there could not have been fewer than 500 birds.

THE WHIMBREL (*Numenius arquata*).

Almost never seen with us but in May, during its migratory flight northwards. A few are tempted to travel along the shore as far as the Clyde estuary, where they linger about two weeks. The principal flocks appear to take a more direct line to their breeding quarters, by steering for Islay, Jura, and Mull, and thence to the outer Hebrides, where they make a longer stay.

THE COMMON REDSHANK (*Totanus calidris*).

Breeds in both counties, and is nowhere more common than in the Bay of Luce, from Port-William to the Drumore coast. Its summer haunts are numerous throughout the district, and present a variety of scenery, from the low lying marshes of the south of Wigtown to the chain of moorland lochs lying embosomed among some of the finest mountain ranges in our district. We have observed it in small flocks on the coast as early as the beginning of July.

OBS.—The Green Sandpiper (*Totanus ochropus*), and the Wood Sandpiper (*T. glareloa*), have both occurred in districts bordering upon our limits, but not exactly within the prescribed boundaries.

THE COMMON SANDPIPER (*Totanus hypoleucos*).

This lively species is very common from April to September, frequenting every stream, and many of our moorland lochs, on the banks of which they breed in considerable numbers. On the Girvan Water, which is subject to frequent floods, these birds instinctively avoid places for nesting inside the embankment, and invariably betake themselves to the adjoining turnip and potato fields, where the nest is often found under shelter of the leaves of the growing plants. The young, on being hatched, are led by both parents to the water's edge, where they remain almost continually until able to shift for themselves. We have also found the broods in drains and ditches communicating with the river. In the autumn the families assemble, and follow the stream to the sea, where they remain a week or ten days before finally leaving the coasts.

THE GREENSHANK (*Totanus glottis*).

Sparingly distributed along all the shores in autumn and winter. In the months of August and September we have seen it ascending the courses of our larger streams, and coming to a distance from the sea-coast. Two very fine specimens now before us were shot by Dr Anderson in the pebbly bed of Girvan Water, on Enoch Farm, some years ago.

THE BAR-TAILED GODWIT (*Limosa rufa*).

In the Bay of Luce and also in Wigtown Bay this bird finds an agreeable resting-place in its flight southwards at the close of summer. On the coast of Ayrshire, however, it is much seldomer observed, probably from the fact of the western migratory flocks coming down from the Hebrides, and taking the southern point of Scotland as their guide to the Solway Firth, where considerable numbers remain during the whole of the winter months.

OBS.—The Black-tailed Godwit (*Limosa melanura*) has occurred on two occasions on the confines of our district. One was shot on the Renfrewshire side of the Clyde estuary on 25th November, 1867; another was killed on the Castle Semple Estate, near Lochwinnoch, in the last week of August, 1869.

THE RUFF (*Machetes pugnax*).

So far as we can judge, this species is rare in any part of our district. The Solway Firth appears to check its progress northward in autumn, or rather to divert the line of its flight eastward through the southern portion of the counties of Roxburgh and Berwick to the shores of Haddington and Fife. The Ruff has occurred in Renfrewshire, and we lately heard of a specimen having been shot near Kilbirnie, in Ayrshire—an inland situation. The female is apt to be overlooked by ordinary sportsmen, owing to its small size.

THE WOODCOCK (*Scolopax rusticola*).

A common winter visitant. It arrives generally in September, and leaves in April. Many of these birds are taken in lighthouses about the time they pass northward. We have not yet heard of the nest having been taken in any part of our district.

THE GREAT SNIPE (*Scolopax major*).

A specimen of this bird was shot by Mr W. Boyd of Greenock, in September, 1868, on the lands of Corsehouse, in the parish of Stewarton, as narrated in Gray's "Birds of the West of Scotland." The species has likewise been shot in Renfrewshire, on the borders of our district.

THE COMMON SNIPE (*Scolopax gallinago*).

Abundant in suitable localities over the district. The great amount of drainage, however, which has been effected during the last twenty years, has been the means of banishing the snipe from former waste lands now under cultivation. Numbers are yet observed in the larger drains and ditches bounding the grain and grass fields of the low country.

THE JACK SNIPE (*Scolopax gallinula*).

Strictly a winter visitant, and found in some numbers in small marshes and moist meadows.

THE CURLEW SANDPIPER (*Tringa sub-arquata*).

Not commonly met with, although it is probably seldom absent, during the winter months, from Loch Ryan, Luce Bay, Garliestown shore, and the Bay of Wigtown. It can only be regarded as a straggler on other parts of the coast of either county, and is, for the most part, seen there on its arrival in the beginning of autumn.

THE KNOT (*Tringa canutus*).

So far as our observations extend, this species is rather rare in our district. It never appears on our shores in flocks of more than three or four birds. One was taken on the lantern at the Mull of Galloway Lighthouse, in September, 1866; but Mr Gray, who happened to be there at the time, was informed by the keeper that he had never seen one in the district before.

THE DUNLIN (*Tringa variabilis*).

This extremely variable species, as regards size, colouring, and length of bill, is found in great numbers on the sea-coast, in sandy bays, and muddy estuaries, and is also met with, sparingly, during summer, breeding on the margins of little fresh water lochs and pools among the hills. Mr Gray is inclined to regard the dunlin of the Outer Hebrides as belonging to a northern race, being darker in colour and much smaller in size than that found on the south-western mainland.

THE PURPLE SANDPIPER (*Tringa maritima*).

Occurs in irregular flocks on the rocky parts of the Ayrshire coast, and has also been found in Wigtownshire. Dr Anderson killed five of these birds at a shot, near Girvan, a few years ago. We have also seen specimens killed near Ardrossan.

THE GREY PHALAROPE (*Phalaropus lobatus*).

Of very rare occurrence in any part of our district. Single examples have been obtained on the northern shores of Ayrshire. It has also occurred in Renfrewshire. The Red-necked Phalarope (*Phalaropus hyperboreus*) has never, to our knowledge, been met with in Ayrshire or Wigtownshire.

RALLIDÆ.

THE LANDRAIL, OR CORN CRAKE (*Crex pratensis*).

Abundant everywhere. With us it calls throughout the whole of the night, from the time of its arrival till the end of July. In warm seasons numbers of corn crakes frequent the Water of Girvan about mid day, and appear to delight in bathing in the little pools among the pebbles of the stream. During excessive heat, we have seen these birds anxiously traversing the dusty roads in quest of water.

THE SPOTTED CRAKE (*Crex porzana*).

In both counties this bird has several times been captured, and it has been taken in Renfrewshire. Mr M'Omish, bird-stuffer, Stranraer, showed Mr Gray a specimen killed near that town in 1867. From its quiet and unobtrusive habits, the spotted crake is but seldom observed anywhere.

THE WATER RAIL (*Rallus aquaticus*).

Occurs sparingly in suitable localities. It seems to prefer marshy spots of inconsiderable extent, where, if unmolested, it remains a long time, seeking occasional refuge in covered drains and thick tufts of herbage. From such places of concealment it is very difficult to dislodge the bird. There is a great difference in size between the sexes.

Mr Thomas Anderson, jun., informed us some time ago that he captured a water rail, which flew on board one of the Cunard steamers in December, 1867, when about 450 miles from land. The ship was on an outward voyage from Liverpool.

THE MOOR HEN (*Gallinula chloropus*).

The familiar water hen is very common in all the streams, lochs, and pools of our district, frequenting also mill-dams, ditches, and other water courses, especially such as are fringed with a profusion of water plants, where the birds can hide themselves from observation. The eggs of this species are, in some districts, subject to considerable variation in size, markings, and general appearance.

LOBIPEDIDÆ.

THE COMMON COOT (*Fulica atra*).

Found with the preceding species in the larger lochs, but not, so far as we have observed, in water courses or drains.

NATATORES.

ANATIDÆ.

THE GREY-LAG GOOSE (*Anser ferus*).

Stray birds of this species are occasionally found during the winter months on the larger inland lochs and marshes. Their appearance, however, is uncertain. The attractions of the western islands as a feeding ground are sufficient to prevent these birds wandering to any great extent. A portion of both counties is visited by small flocks in passing southward in the beginning of winter, and again in March and April as they return. On these occasions they often alight on Ailsa Craig, and pitch upon a marsh there.

THE BEAN GOOSE (*Anser segetum*).

Of occasional occurrence in moist ground in retired moorlands, and sometimes seen in flocks on the sands at the Bay of Wigtown and near Glenluce. The following note is taken from Thomson's "Birds of Ireland":—"A sporting friend, residing in the south of

Ayrshire, has occasionally met with Bean Geese in the bogs there, and sprung them from among beds of wild roses, on the fruit of which (a small mountain species) they must have been busied feeding, as proved on dissection of those killed."

THE PINK-FOOTED GOOSE (*Anser brachyrhyncus*).

Of rare and uncertain occurrence only; one or two specimens, at most, being all that are identified during the course of a season.

THE WHITE-FRONTED GOOSE (*Anser albifrons*).

Occurs in small flocks on the low-lying grassy shores of Wigtownshire, and is sometimes taken, with other wild fowl, by keepers and others who practise loch-shooting for the market.

THE BERNICLE GOOSE (*Anser leucopsis*).

Numbers of this species frequent the Firth of Clyde in winter, and are also observed on the sands at Luce Bay. The passing flocks going northwards assemble at a pool of the estuary near Dumbarton Castle, where they seem to have attracted the notice of the curious nearly three hundred years ago.

THE BRENT GOOSE (*Anser torquatus*).

Much less common than the preceding species, occurring, perhaps, in the proportion of one to fifty. It is better known in the eastern counties. Small numbers are every winter sent, along with other wild fowl, from Ayrshire shootings to the Glasgow market.

THE CANADA GOOSE (*Anser Canadensis*).

Has been once or twice observed on some of the larger lochs of both counties. A specimen shot on Tarbolton Loch, 11th March, 1865, is now in the collection of our friend Mr William Sinclair of Glasgow.

THE HOOPER, OR WHISTLING SWAN (*Cygnus ferus*).

At the close of last century, flocks of this species appeared every winter on Loch Inch, and other similar sheets of water in Wigtownshire. These lochs are still visited by passing flocks, but not regularly. Considerable numbers annually visit Lochwinnoch in Renfrewshire, which is on the borders of our district.

In this beautiful loch there are about fifty tame swans, and it is a sight of no ordinary interest to see the fleet of noble birds sailing together on the blue waters. Persons resident in the neighbourhood inform us that the winter visitants are much smaller in size, darker in colour, and much more active on the wing than the usual residents. Many of these are, of course, referable to the next species.

BEWICK'S SWAN (*Cygnus Bewickii*).

This species is sometimes recognised in lochs and ponds in severe winters, many of the birds being in the plumage of the first year.

THE COMMON SHELLDRAKE (*Tadorna vulpanser*).

This showy and handsome bird is not uncommon in rabbit warrens on the coasts of both counties. It appears, however, to be more plentiful in Wigtownshire. We have obtained the eggs from near Garliestown. It also breeds in Kirkcudbrightshire. A number of pairs used to breed on the Horse Island, off Ardrossan, but of late years these have become reduced, on account of the frequent visits made to the locality by boating parties from the harbour, and this year (1869) only one pair has been observed.

THE SHOVELER (*Anas clypeata*).

Has occurred but in three instances in our district. A pair—male and female—were shot on the Cree, near Newton-Stewart, in the spring of 1865, by James Hamilton, keeper. Another was shot in the month of May, 1860, in a small burn on the farm of Drummuck, near Girvan, by a son of Mr Davidson, farmer there.

THE GADWALL (*Anas strepera*).

With the exception of a single specimen—a male—shot on the loch of Tarbolton a few years ago, we cannot trace the occurrence of this species anywhere in our district. It is, notwithstanding, a bird of tolerably wide distribution in western Scotland.

THE PINTAIL DUCK (*Anas acuta*).

Of occasional and uncertain appearance only; appearing singly, in most cases, on the larger streams and inland lochs.

THE WILD DUCK (*Anas boschas*).

Abundant everywhere. We have seen very large flocks coming up from the coast at twilight to the potato pits on some Ayrshire farms, where they committed much mischief. On the private ponds they take up their quarters throughout the winter months, and, if unmolested, often remain to breed in the vicinity.

THE GARGANEY (*Anas querquedula*).

We have been informed by the Rev. George Wilson of Glenluce, that a specimen of this beautiful duck, which he had an opportunity of examining, was shot in the Bay of Luce in 1867.

THE TEAL (*Anas crecca*).

Also common. In hard winters it ascends the course of the frozen rivers, and is often taken in the neighbourhood of mill-ponds where the water is kept running. Dr Anderson procured several beautiful males, by making an opening in the ice, a few winters ago, and keeping a look-out for the birds as they halted in their flight before alighting at the spot.

THE WIGEON (*Anas penelope*).

A very common winter visitant, appearing in September or October, and leaving in March or April. This species sometimes pairs early, and in these particular seasons they disappear sooner.

THE EIDER DUCK (*Somateria mollissima*).

This large and conspicuous bird is very seldom procured. It may occur much oftener than we suppose, but being strictly of marine habits, few persons have an opportunity of shooting it. So far as we can learn, it does not breed anywhere in our district.

THE VELVET SCOTER (*Oidemia fusca*).

Very rarely observed on the coast, and very few specimens are ever obtained. It is better known as a winter visitant to the eastern shores of Scotland.

THE COMMON SCOTER (*Oidemia nigra*).

Equally scarce with the preceding, and almost never procured, although readily enough distinguished when seen.

THE POCHARD, OR DUN BIRD (*Fuligula rufina*).

A well-known winter visitant to our estuaries at twilight. During the day-time it frequents fresh-water lochs at some distance inland, and is sometimes procured in quantities by poachers, who watch their opportunity for a raking shot.

THE SCAUP DUCK (*Fuligula marila*).

Frequents the open sea chiefly during the day-time, coming shorewards in the evening. It appears to be somewhat irregular in numbers—some winters the flocks are tolerably numerous; at other times a pair or two only are seen.

THE TUFTED DUCK (*Fuligula cristata*).

Strictly a winter visitant; frequenting the open sea in fine weather, and coming up the larger rivers during storms. It is also found on our lochs and ponds, especially those not far from the coast.

OBS.—Although the Long-tailed Duck (*F. glacialis*) is found in considerable numbers in the Hebrides, we have never had an opportunity of seeing it in our district.

THE GOLDEN EYE (*Fuligula clangula*).

This fine species is rather common with us at times. It is, perhaps, more frequently met with in Wigtownshire than in Ayrshire, but cannot be called rare in the latter county. Most of the specimens we have seen were young birds and females.

THE SMEW.

So far as we know, this beautiful bird has occurred but once in Wigtownshire, a male having been shot, in March, 1855, on Castle Kennedy Loch, near Stranraer. For this record we are indebted to the Rev. George Wilson of Glenluce.

THE RED-BREASTED MERGANSER (*Mergus serrator*).

Breeds sparingly in both counties. In the winter season it is often shot on the sea-coast.

THE GOOSANDER (*Mergus merganser*).

In spring time very handsome specimens of this fine bird are obtained on our lochs and rivers.

COLYMBIDÆ.

THE GREAT CRESTED GREBE (*Podiceps cristatus*).

Very rarely met with in either of the counties. Being resident all the year in Ireland, it is somewhat singular that few, if any, of the young birds hatched in the loughs there find their way to the western shores of Wigtown.

THE RED-NECKED GREBE (*Podiceps rubricollis*).

Equally rare with the preceding; very few specimens being obtained. It is occasionally seen in the estuaries, and at some distance up the rivers, but not later than the month of April. One of these birds in the breeding plumage was shot, a few years ago, at Caldwell in Ayrshire, and is now in the collection of Mr Orr, Kilbirnie.

THE SCLAVONIAN GREBE (*Podiceps cornutus*).

Uncommon, and generally seen at sea when it does occur. It turns up occasionally on fresh water lakes in spring and autumn, but is entirely absent during the summer months.

THE LITTLE GREBE, OR DABCHICK (*Podiceps minor*).

Even this species, which is so numerous in almost all other parts of Scotland, is not common. Mr Gray saw one lately in the possession of H. Stewart, Esq. of Tonderghie, near Burrow Head, and was surprised to learn from that gentleman that it was extremely rare in his neighbourhood. In Ayrshire, however, it is more frequently obtained.

THE GREAT NORTHERN DIVER (*Colymbus glacialis*).

Very common in both counties. It is, indeed, found in great numbers off the coast of Wigtownshire in autumn and winter. We have seen it also in summer near Girvan, in pairs, about a mile off shore on warm days during a dead calm, when their hoarse conversation was distinctly heard. When in pursuit of prey, they are at this season occasionally taken in the salmon nets near the town. Mr Anderson saw two very fine specimens in the last week of May, 1869. One of these—a brilliant bird in full summer dress—is now in the possession of Mr Murray, banker, Girvan. In August, old birds still partly clad in this plumage have been seen near Ballantrae, each attended by a young one about the size of a wild duck. Mr Watson of Stranraer informs us that he repeatedly sees three or four at a time off the Galloway coast near Kirkmaiden.

THE BLACK-THROATED DIVER (*Colymbus arcticus*).

Occurs off the coasts, chiefly in spring and beginning of summer, about the time of moving towards the breeding localities to the north-west. We have seen pairs of this beautiful bird also off Girvan. Mr Anderson had a splendid specimen, in the breeding plumage, presented to him by Mr Murray. It was taken alive in the salmon nets, and has lately been transferred to Mr Gray's private collection in Glasgow.

THE RED-THROATED DIVER (*Colymbus septentrionalis*).

So far as we can learn, this species is only a winter visitant; it is frequently taken in fresh-water lakes, deep pools in rivers, and still oftener on the sea-coast, close to the shore, where it finds its favourite food in suitable quantity. It is very rarely met with in the breeding plumage in our district.

ALCADÆ.

THE COMMON GUILLEMOT (*Uria troile*).

A very common species off the coasts of both counties. Its breeding haunts are at Ailsa Craig, in Ayrshire, and the Scaur rocks, at the entrance to the Bay of Luce, in Wigtownshire—at both of which places it is found in great abundance. Vast numbers were at one time killed yearly on Ailsa Craig, during the breeding season; but since the passing of the "Sea Birds Preservation Bill" the practice is believed to have been discontinued. At the Scaur Rocks the birds were seldom if ever molested.

Towards the close of summer, large companies of these birds occasionally congregate near the shore, and remain there for days in calm weather, over the sand banks where their food is obtained.

THE RINGED GUILLEMOT, OR BRIDLED GUILLEMOT (*Uria lachrymans*).

Occurs at Ailsa Craig and also at the Scaur Rocks, in the proportion of one to five hundred of the commoner species. We have proved this at various times on the Craig, by counting the slaughtered birds taken in the tacksman's nets. In 1867 we counted over 1500 of *Uria troile*, in which we found two specimens of this bird; but one of the men stated that he had obtained a third, which he had taken out of the net alive, and tethered to a stone. On returning, however, to the place, he could not hit on the exact spot, and so lost the bird.

THE BLACK GUILLEMOT (*Uria grylle*).

We have seen this bird in summer, near the entrance to Loch Ryan, and also in the Bay of Luce, but have not been able to find it incubating either on Ailsa Craig or the Scaur Rocks. From the frequency of its occurrence at this season, however, it is probably a native of both places. During the winter months it is found in small numbers in the Firth of Clyde, from Ayrshire to Port-Glasgow, and small numbers have been observed, in the full breeding plumage, off Ardrossan. Mr Gray examined a very fine one which had been shot by Mr Steedman near the Horse Island. We have reason to believe that one or two pairs breed in the rocky fissures near Kildonan, in Arran.

THE LITTLE AUK (*Mergulus melanoleucos*).

The late Mr Thompson, in his work on the "Birds of Ireland," states that, on 19th May, 1849, "Mr Darragh, of the Belfast Museum, saw four little auks on Ailsa Craig;" but during a long experience in the estuary of the Clyde, and numerous visits to the Craig, it has never come under our observation. In one or two instances examples of its occurrence in winter have been made known to us. In the season of 1867–68, a number of little auks were driven inland at various places. One of these was picked up at Kilmarnock, and given to Mr Eaton there, in whose hands Mr Gray saw it.

As a rule, this bird is found much more plentifully on the eastern coasts of Scotland.

THE PUFFIN (*Fratercula arctica*).

Occurs in immense numbers on Ailsa Craig during the breeding season, and is found plentifully on all parts of the coast between Ayr Heads and the Mull of Galloway from February to October. On Ailsa Craig its burrows are found under the broken rocks piled at the base of the island, and also on a part of the grassy slopes about half way towards its summit. The young are fed, for the most part, on sand eels, quantities of which are brought by the old birds to the burrows—each having from six to eleven of these fishes at a time. These are often procured at a considerable distance from the rock, as any one accustomed to make repeated visits to that celebrated breeding place may easily testify by observing the puffins, many miles away from it, rise from the water and steer straight homewards, with their bills quite full. The male of this bird is said to have a larger bill than the female; and with the view of ascertaining whether the former took part in the duties of incubation, we turned over upwards of 500 dead ones during the occasion of our last visit, but found not more than half-a-dozen large billed specimens in that number. These puffins had been taken out of the nets in the course of three days' fowling, and in many of the burrows we found eggs and newly-hatched young birds—the former in many instances being addled, and the latter dead. Mr Gray has elsewhere dwelt on the habits of the puffin in this locality.*

THE RAZORBILL (*Alca torda*).

A very common species on Ailsa Craig in the breeding time, and also a native of the Scaur Rocks in Luce Bay. In September, 1859, a very extraordinary mortality occurred among the sea fowl of the Craig, which was largely shared in by this species. A number of razorbills are taken annually by the Girvan fishermen when drawing their nets, which are sometimes floated within a mile or two of the rocks.

PELECANIDÆ.

THE COMMON CORMORANT (*Phalacrocorax carbo*).

The gaunt figure of this well-known bird is seldom wanting on our sea beacons and isolated rocks within a short distance of the shore. At any season the cormorant is nowhere more abundant than along the shores of Wigtownshire, especially that part of the coast between Glenluce and Port-William, where fifty or sixty are constantly seen, either fishing, in the winter months, or, in summer, drying their wings preparatory to their inland flight. Their nursery is, or was until recently, situated on the banks of the Castle Loch, about seven miles inland.* Another very important breeding station is at Loch Moan, in Ayrshire, and is frequented by several hundred pairs, which lay their eggs on a small island in the middle of the lake. The nesting haunts of this species, however, are not confined to inland districts. A pretty extensive colony may be seen hatching on a part of the cliffs between Ballantrae and the entrance to Glen App, and a few pairs are also found breeding on Ailsa Craig.

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* See "Birds of the West of Scotland."

THE SHAG, OR GREEN CORMORANT (*Phalacrocorax graculus*).

The green cormorant occurs much less frequently than the preceding species; it is, however, a common bird of the coasts. Its breeding haunts with us are strictly confined to Ailsa Craig and the numerous caves which exist southwards of Ballantrae, and again at the Mull of Galloway and Burrow Head.

THE GANNET, OR SOLAND GOOSE (*Sula alba*).

Off the Ayrshire coast the gannet is a daily object of attention as it sweeps its pure white figure against the blue sky or the dark cloud. Occasionally it comes very near the beach; we have observed it in shallow bays diving after whitings, in a depth of water not exceeding three or four feet. On such occasions the plunge was made at an acute angle, the gannet appearing almost immediately, and before its body had time to be fully submerged. Its mode of fishing was very skilful and guarded. The gannet appears off our coasts early in February, and generally leaves about the close of September; its movements, however, are considerably influenced by the abundance or scarcity of the various fish upon which it is known to feed.

LARIDÆ.

THE SANDWICH TERN (*Sterna Boysii*).

We have recognised this fine species in flight off the coast near Girvan, and have seen an occasional specimen shot in our district. We have not, however, been able to discover it breeding on any of the rocks frequented by the other species.

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* This loch, one of a group, is situated in the parish of Mochrum, and throughout the district these birds are known by the name of "Mochrum Elders."

THE COMMON TERN (*Sterna hirundo*).

A comparatively common species in the Firth of Clyde, but a very few pairs only breed with us.

THE ARCTIC TERN (*Sterna arctica*).

More common than the preceding species. At low water occasional specimens are seen along the shore near Girvan, picking up the slender fishes on which they feed. Mr Anderson came upon a small flock of these birds some years ago in very peculiar circumstances. He was driving his dog-cart within a mile of Girvan one winter afternoon, during a thick fall of snow, when the terns suddenly made their appearance, flapping around the horse's ears. Using his whip vigorously, he struck down three of the birds, and captured them.

THE LESSER TERN (*Sterna minuta*).

So far as we can ascertain, this beautiful species is of somewhat rare and uncertain occurrence in either county. It is probably found every year in limited flocks when travelling southwards from their breeding stations, but these are nowhere numerous on the west coast. Mr Eaton, of Kilmarnock, has in his collection a specimen in the first month's plumage, which was shot on the Water of Irvine a few years ago.

THE BLACK TERN (*Sterna fissipes*).

Of very rare occurrence. It has been observed on one or two occasions, and in one instance at least a specimen has been obtained. The bird referred to was shot on 29th August, 1868, at Broadstone, near Stranraer, and preserved by Mr M'Omish, bird-stuffer there.

THE LITTLE GULL (*Larus minutus*).

In the Transactions of the Wernerian Society of Edinburgh it is recorded by Mr Selby that a specimen of this bird was procured in Wigtownshire.

No other example of the species has come under our observation.

THE BLACK-HEADED GULL (*Larus ridibundus*).

A very abundant species throughout both counties. There are many breeding stations in our district—such as Loch Doon in

Ayrshire—which are frequented by thousands of birds; and as the eggs are not farmed out as in England, these nurseries are seldom invaded, except by mischievous boys in quest of adventure, or some prowling fox desirous of giving her cubs a change of diet.

In the heat of the summer months we have often observed a pair or two of this gull hunting over the potato fields near Girvan with great regularity, and picking up worms and snails, thus proving themselves useful friends of the farmer. One of these birds is at present living as a familiar pet in a house at Girvan, where it has been confined for the last thirteen years. It assumes the black cap regularly, like a wild bird, in spring, and becomes white in winter.

THE KITTIWAKE GULL (*Larus tridactylus*).

This beautiful gull is very common along the shores of Ayrshire during the spring months. In May the flocks assemble on Ailsa Craig, their chief breeding place, and become dispersed after the duties of incubation are past. The greater number migrate to other countries in the month of October, but many remain throughout the entire winter. Perhaps it would be more correct to say that these winter birds are visitants from more northern latitudes. In the Firth of Clyde they are seen in flocks near the beach and in harbours, where they appear to subsist principally upon the remains of fish, and other substances thrown out by the fishermen.

THE IVORY GULL (*Larus eburneus*).

Although the ivory gull has never, to our knowledge, been actually obtained in our district, there can be little doubt of its having occurred off the coasts. Various examples have been met with in surrounding localities, namely, Islay, Argyleshire, Arran, and Renfrewshire. In June, 1854, Mr William Sinclair saw an ivory gull on Ailsa Craig, and was near enough to recognise it.

THE COMMON GULL (*Larus canus*).

Also a very common species, breeding on Ailsa Craig, the Scaur Rocks, and the Mull of Galloway. They also nest by the side of some of the inland lochs in Wigtownshire. It is a well known frequenter of the beach near Girvan from September to April.

THE ICELAND GULL, OR LESSER WHITE-WINGED GULL (*Larus Icelandicus*).

Has been repeatedly observed on Ailsa Craig. The late Mr Thompson procured two specimens from Ballantrae, and the species has been observed by Mr Gray in other parts of Ayrshire. It appears to be an indolent bird during the day time, admitting of a near approach, and consequently, where it does occur, it is not difficult to obtain.

THE LESSER BLACK-BACKED GULL (*Larus fuscus*).

Extremely common throughout our district, breeding upon Ailsa Craig in great numbers, and also on the borders of the Castle Loch, and other similar patches of water in Wigtownshire. In the harvest months great numbers betake themselves to grass fields at some distance inland about nightfall, and remain there until daybreak, when they again get on wing, and repair to the sea shore. In wild weather, however, they linger in the field until the day is well advanced, and come back in the afternoon much earlier, taking up their old position, as if reluctant to expose themselves to the storm. This bird, like the black-headed gull, is often seen at Girvan beating over the potato fields daily in the middle of summer, and alighting every minute or so to pick up the snails, worms, and caterpillars for which it so diligently searches.

THE HERRING GULL (*Larus argentatus*).

The herring gull is a very common species throughout the year, but appears to be strictly confined to the sea coast. In the breeding season it haunts the cliffs at the Mull of Galloway, the Scaur Rocks, and Ailsa Craig. This bird is a notorious egg-lifter, and will even devour young grouse, and other game, when it gets an opportunity. On Ailsa Craig it rivals in this respect, if it does not exceed in rapacity, its congener, the lesser black-back, and pounces upon the unprotected eggs of the guillemot or razor-bill with unfailing success. The curlew, and its kindred, are equally molested during the breeding time. In the winter season they subsist entirely on what the sea shore affords them.

THE GREAT BLACK-BACKED GULL (*Larus marinus*).

This bird has even a worse reputation than the preceding species. It is hardly so common with us, but is still sufficiently numerous to form an important item in the bird life of our district. At Girvan we have observed several pairs coming apparently from Ailsa Craig, and proceeding with strong-winged beats, high in the air, in the direction of some of the largest sheep farms on the hills, and have watched their raven-like flight until they disappeared beyond the top of the Saugh Hill. Their prey, we doubt not, was variously suggestive.

THE POMERINE SKUA (*Lestris pomarinus*).

This species, easily recognised by its superior bulk from Richardson's skua, has been observed in various parts of Ayrshire. It has, according to the late Mr Thompson, occurred at Ballantrae, and Mr Gray has observed it off the coast on more than one occasion. It has likewise been obtained in Wigtownshire.

RICHARDSON'S SKUA (*Lestris Richardsonii*).

Occasionally observed along shore chasing the sea gulls. It visits Ailsa Craig early in the season—probably before retiring to its breeding quarters—and delights in molesting the kittiwakes, among whom he is a most unwelcome intruder. About this time also it scours the coast line as far as the Mull of Galloway in the same pursuit, but is seldom or never observed in June, July, or August, when the birds are hatching.

BUFFON'S SKUA (*Lestris Buffonii*).

Can only be ranked with us as a rare straggler. The last and most recent specimen coming under our observation was one shot on the Cree, near Newton-Stewart, in the spring of 1863.

THE MANX SHEARWATER (*Puffinus anglorum*).

As this bird seldom approaches the coast nearer than a mile's distance, it is not often observed, except by those who go in quest of birds, or are interested in their movements. It may, however, be seen regularly passing and repassing even as late as the end of June. There are probably no breeding stations of this species nearer us than the islands of Mull, Staffa, or Iona; yet it is possible that they may extend their daily excursions to the Ayrshire coast, as their flight is extremely easy and buoyant.

THE FORK-TAILED PETREL (*Thalassidroma Leachii*).

Occasionally cast on shore in rough weather. A specimen was taken at Stranraer in the winter of 1863. In the west of Scotland generally this species is found to be about as numerous as the storm petrel.

THE STORM PETREL (*Thalassidroma pelagica*).

During the severest winter storms, this diminutive bird of the ocean occasionally loses its reckoning, and is blown on shore. We have seen specimens taken at Kilbirnie and Kilmarnock, and other towns at some distance inland. It breeds in limited numbers on Ailsa Craig; and we have seen it flying in small groups about midway between that rock and the mainland.

CONCLUDING REMARKS.

In closing this catalogue of the Birds of Ayrshire and Wigtownshire, we cannot withhold the expression of a belief, in which we trust that most persons interested in ornithological pursuits will readily join, that the time has now arrived when the protection of various classes of birds has become a paramount duty. We have only to consider the vast diminution of species that has taken place during the last thirty years in order to learn the mischief that has resulted from one cause alone—viz., the over-zealous destruction of creatures that are supposed to be enemies to game. In the exercise of their daily avocations, gamekeepers throughout the whole of these districts have, in fact, done more to thin our bird population than any other class of men. Birds of prey especially have suffered to an almost inconceivable extent—eagles, falcons, buzzards, hawks, and owls having been subjected to such continual persecution as to be now in some places on the verge of extinction as native species. Making due allowance for the ravages committed by some of the Raptorial and Corvine species, we believe that many of the birds which fall victims to the game preserver's vengeance are totally innocent of the charges laid against them. Owls, for example, are for the most part guiltless—their principal prey consisting of rats, mice, and other vermin that require to be kept in check. Nightjars and dippers are also harmless; and even the Kestrel falcon, which shares the fate of the hooded crow or the polecat, is not only harmless but useful as a devourer of mice and beetles, thus proving itself a friend instead of an enemy.

But apart from these considerations, it must be admitted that the destruction of certain groups of birds tends to derange that nicely-balanced harmony which is everywhere apparent in the dominion of Nature. Ample proof of this has been experienced in our own country, where the banishment of owls has been known to result in an inordinate increase of the various species of field mice, which constitute the ordinary food of these useful birds, and also in other countries, where the disappearance of insectivorous species has been followed by insect plagues—these examples, and many others which could be cited, tending to shew that Nature's plans are, at least, incapable of amelioration through man's interference.

To advocate the protection of eagles and falcons, therefore, for a time at least, would appear to us to be but a reasonable duty; and to influence our landed proprietors, with whom the power chiefly lies, in their favour, we would regard as only a just compensation for injuries already inflicted. It is certainly a matter of regret that some of our Scottish proprietors should actually have lent their influence against the protection of bird life. From these nothing can be expected but an unwilling obedience to laws already enacted for the preservation of certain maritime species that throw themselves entirely on the mercy of man during the breeding season; and naturalists may indeed congratulate themselves that the recent opposition brought to bear against the passing of the "Act for the Preservation of Sea Birds"—a humane and salutary law—was signally defeated.

We still cling to the hope that similar enactments may yet be framed for the protection of land birds, from the soaring eagle to the timid thrush; and until this takes place, proprietors would earn the gratitude of all true naturalists by resolving to discontinue the deadly practice of exterminating what their keepers have branded as vermin, and let our woods, fields, and mountain sides regain what has now for many years been wanting to give a charm to some of the finest, and, at the same time, the wildest scenery in the British Islands.

In a volume of 220 pages now before us, relating to the "Game Laws of the principal States of the United States and Canada," we find that Section VI. of the laws of the State of New York provides for the protection of a large number of land birds, including the eagle, fish hawk, night hawk, whip-poor-will, swallow, oriole, woodpecker, bobolink, *or any other harmless bird.* The penalty for violating the provisions of this Act is stated at fifty dollars for each offence, and it may be presumed that the exemption in favour of naturalists desirous of studying their habits or history and having them preserved as cabinet specimens, will commend itself to the most fastidious collector. Such an Act, if applied to our own country, would operate favourably in many ways, and lead to a restoration of bird life that would prove welcome not only to students of nature but to those very persons who, under a mistaken prejudice, are at this moment its worst enemies.

Waiving this digression, however, we think that, in common fairness, to adduce no stronger argument, birds of all kinds should have a "close time" during the season of incubation. It is not right that any class of creatures should be killed when brooding on their eggs, or exposing themselves to danger in the protection of their defenceless young. In the case of birds especially, many species wholly throw aside their usual wariness at such a season; and as regards isolated places like Ailsa Craig, exposed as they are to the plundering visits of heartless pleasure seekers, no one, we think, will ever call in question the wisdom or humanity of providing for their future protection.

II.—*On some Lepidopterous Insects from Congo.*

By Mr Thomas Chapman.

Plates V, VI, and VII.

A large series of specimens in very fine order, lately received from Congo, were exhibited. Mr Chapman remarked upon the great unexplored field in tropical Africa waiting to be visited by the naturalist, exemplified by these Congo insects. About seventy-five per centum of the moths in this small collection are new to science; and among the butterflies the genus *Harma* is represented by five new species, indicating that the head-quarters of this very beautiful genus had been reached. Of the moths, twenty-six new genera and seventy-six new species, are described below by Francis Walker, Esq., F.L.S.

LEPIDOPTERA HETEROCERA.

Tribe. *SPHINGITES.*
Family. Smerinthidæ.
Genus. Smerinthus, *Latr.*
S. subjectus.
Genus. Ambulyx, *Boisd.*
A. constrigilis.
Genus. Basiana, *Walk.*
B. suffusa.

Tribe. *BOMBYCITES.*
Family. Agaristidæ.
Genus. Eusemia, *Dalm.*
E. pardalina.
Family. Nyctemeridæ.
Genus. Nyctemera, *Hubn.*
N. simplex.
N. decisa.
Family. Zygænidæ.
Genus. Balacra, *Walk.*
B. ochracea.
Family. Melameridæ.
Genus. Leucopsumis, *Hubn.*
L. cryptochroma.
Family. Pericopidæ.
Genus. Aletis, *Hubn.*
A. postica.
Genus. Phægorista, *Boisd.*
P. similis.
Family. Hypsidæ.
Genus. Surina, n.
S. hypsoides.
Genus. Hypsa, *Hubn.*
H. dissociata.
Genus. Zaracha, n.
Z. extranea.
Family. Lithosiidæ.
Genus. Soloe, *Walk.*
S. quadriguttata.
Genus. Barsine, *Walk.*
B. indecisa.
Family. Arctiidæ.
Genus. Spilosoma, *Steph.*
S. ramivitta.
Genus. Sciatta, n.
S. inconcisa.
Family. Liparidæ.
Genus. Artaxa, *Walk.*
A. squamiplaga.

Genus. Zarfa, n.

Z. lunifera.

Genus. Sizalisca, n.

S. graminosa.

Genus. Viana, n.

V. velutina.

Family. SICULODIDÆ.

Genus. Vaena, n.

V. eacleoides.

Family. BOMBYCIDÆ.

Genus. Pœcilocampa, *Steph*

P. sublineata.

Family. LIMACODIDÆ.

Genus. Nyssia, *Herr-Sch.*

N. rudis.

Genus. Zinara, n.

Z. nervosa.

Family. SATURNIIDÆ.

Genus. Antheræa, *Hubn.*

A. rhodophila.

A. intermiscens.

TRIBE. *NOCTUITES.*

Family. BRYOPHILIDÆ.

Genus. Tachosa, n.

T. acronyctoides.

T. metaphæaria.

Family. GLOTTULIDÆ.

Genus. Tuerta, n.

T. chrysochlora.

Genus. Petrinia, n.

P. lignosa.

Family. NOCTUIDÆ.

Genus. Agrotis, *Ochs.*

A. hemileuca.

A. catenifera.

Family. ACONTIDÆ.

Genus. Tavila, n.

T. indeterminata.

Family. ERASTRIDÆ.

Genus. Erastria, *Ochs.*

E. decora.

Family. ANTHOPHILIDÆ.

Genus. Hydrelia, *Guén.*

H. terminata.

Genus. Micra, *Guén.*

M. convergens.

M. intricata.

Family. EURHIPIDÆ.

Genus. Eutelia, *Hubn.*

E. quadriliturata.

Family. HEMICERIDÆ.

Genus. Nedroma, n.

N. ferruginea.

Family. HYPOGRAMMIDÆ.

Genus. Stridova, n.

S. albigutta.

Genus. Briarda, *Walk.*

B. conturbata.

Family. EREBIDÆ.

Genus. Tolna, n.

T. versicolor.

Family. OPHIDERIDÆ.

Genus. Ophideres, *Boisd.*

O. divitiosa.

Family. OPHIUSIDÆ.

Genus. Achæa, *Hubn.*

A. ophismoides.

A. partita.

Genus. Hypætra, *Guén.*

H. atriplaga.

H. biangulata.

H. (?) nana.

Genus. Athyrma, *Hubn.*

A. albicincta.

Genus. Ophiusa, *Ochs.*

O. subænescens.

Genus. Grammodes, *Guén.*

G. curvilinea.

Genus. Obba, n.
O. prompta.
Family. POAPHILIDÆ.
Genus. Zirona, n.
Z. marginata.
Family. AMPHIGONIDÆ.
Genus. Amphigonia, *Guén.*
A. fumosa.
Family. THERMESIDÆ.
Genus. Thermesia, *Hubn.*
T. (?) sejuncta.
Genus. Capnodes, *Guén.*
C. trinotata.
Genus. Ricla, n.
R. expandens.
Genus. Raclia, n.
R. cervina.

TRIBE. *DELTOIDITES.*
Family. HERMINIDÆ.
Genus. Orixa, n.
O. filifera.

TRIBE. *PYRALITES.*
Family. PYRALIDÆ.
Genus. Pyralis, *Linn.*
P. (?) crassalis.
Family. ASOPIDÆ.
Genus. Samea, *Guén.*
S. figuralis.
Family. BOTYDÆ.
Genus. Vatica, n.
V. rutilalis.
Genus. Botys, *Latr.*
B. interfixalis.

Genus. Xacca, n.
X. trigonalis.
Genus. Opula, n.
O. impletalis.

TRIBE. *GEOMETRITES.*
Family. GEOMETRIDÆ.
Genus. Geometra, *Treit.*
G. congrua.
Family. PALYADÆ.
Genus. Traina, n.
T. stramineata.
Genus. Timana, n.
T. costalis.
Family. BOARMIDÆ.
Genus. Boarmia, *Treit.*
B. abruptaria.
Genus. Tephrosia, *Boisd.*
T. diffusa.
Family. ACIDALIDÆ.
Genus. Acidalia, *Treit.*
A. latifera.
Genus. Nebessa, n.
N. chalybœata.
Family. FIDONIDÆ.
Genus. Scodiona, *Boisd.*
S. cephalotes.
Family. MICRONIDÆ.
Genus. Micronia, *Guén.*
M. tenella.

TRIBE. *PHYCITES.*
Family. PHYCIDÆ.
Genus. Subrita, *Walk.*
S. luctuosa.

1. **Smerinthus subjectus.** *Mas.* Cinereorufus; palpis porrectis crassis obtusis pilosissimis caput paullo superantibus; antennis subpectinatis; abdomine alas posticas longe superante; alis anticis latusculis acutis purpurascente subtinctis, fasciis tribus obliquis viriditestaceis, 1ª, antemedia angulosa marginata; 2ª, postmedia fusco intus marginata; 3ª, submarginali interrupta informi, reniformi viriditestaceo marginata longiuscula, linea obscura transversa subarcuata punctisque duobus nigris basim versus, puncto nigro antemedio subcostali, margine exteriore integro vix arcuato; alis posticis rufocinereis, lineis duabus ferrugineis undulatis.

Male. Cinereous red. Palpi porrect, thick, obtuse, very pilose, extending a little beyond the head. Antennæ slightly pectinated; branches densely setose. Abdomen extending much beyond the hind wings. Legs stout; femora and tibiæ pilose; hind tibiæ with four long spurs. Wings rather broad. Fore wings acute, with a slight purplish bloom; three oblique testaceous bands; 1st band antemedial, zig-zag, bordered by two darker lines, a transverse slightly curved darker line nearer the base, two black points still nearer the base, and a black subcostal antemedial point; 2nd band postmedial, concisely bordered on the inner side by a straight brown line; 3rd band submarginal, interrupted, very irregular; reniform mark greenish testaceous with a darker border, rather long and narrow; exterior border moderately oblique, hardly curved; under side with one line corresponding to the straight line before mentioned. Hind wings reddish cinereous, with two undulating ferruginous lines; these lines are more conspicuous on the under side, where the second one is dentate; exterior border entire, rounded. Length of the body 11 lines; of the fore wings 26 lines.

2. **Ambulyx constrigilis.** *Mas.* Ochraceoviridis; subtus pallide ochracea; antennis serratis; abdomine pallide ochraceo; alis fusco transverse conspersis; alis anticis acutis subfalcatis, lineis quatuor fuscis transversis indeterminatis postice approximatis, plagis duabus lunulaque exteriore costalibus albidis, margine exteriore subexcavato; alis posticis plaga basili nigricante, lineis tribus discoidalibus rufescentibus obliquis arcuatis.

Male. Ochraceous green, pale dull ochraceous beneath. Proboscis very short. Palpi stout, obliquely ascending, closely applied to the head, not rising higher than the vertex; 3rd joint very short. Antennæ serrated. Abdomen pale ochraceous, lanceolate, extending for more than half its length beyond the hind wings; apical tuft very small. Wings long, narrow, transversely speckled with brown. Fore wings acute, subfalcate, with four transverse irregular brown lines, which converge towards the interior border, two whitish costal patches, and an exterior whitish costal lunule, the 2nd patch much smaller than the 1st; exterior border slightly excavated. Hind wings ochraceous, with a blackish patch at the base, and with three oblique curved reddish lines in the disk; middle line much shorter than the others; speckles about the lines reddish. Wings beneath with nearly similar markings. Length of the body 20 lines; of the wings 48 lines.

3. Basiana suffusa. *Fœm.* Cervina; antennis serratis; pedibus nigro spinlulosis; alis lineis duabus fuscis postmediis obliquis angulosis indeterminatis; alis anticis falcatis cinereo suffusis, annulo discoidali fusco indeterminato.

Female. Fawn colour. Proboscis very short. Palpi very broad and short, obliquely ascending, 3rd joint very minute. Antennæ serrated. Abdomen extending much beyond the hind wings. Legs beset with minute black spines; fore tibiæ slightly dilated, excavated beneath; hind tibiæ with four slender spines. Wings with two brown postmedial oblique indistinct zig-zag lines. Fore wings falcate, partly suffused with cinereous; an indistinct brown ringlet at the end of the areolet. Length of the body 12 lines; of the wings 33 lines.

Nearly allied to B. submarginalis.

4. Eusemia pardalina. *Mas.* Nigra; capite palpis thorace pedibusque albo punctatis, abdominis segmentis tarsisque luteo fasciatis; alis anticis luteo pallido sexmaculatis atomis chalybœis acervatim conspersis, fimbria apiculi alba; alis posticis luteis nigro late marginatis, fimbria apicali pallide lutea.

Male. Black. Head, palpi, and thorax with some white points. Abdomen with a luteous band on the hind border of each segment, and with a luteous apical tuft. Femora, tibiæ and joints of the tarsi with white tips; tarsi with a broad luteous band. Fore wings with six large pale luteous spots, of which the sixth is transverse and nearer the tip, and much longer than the others; a few small clusters of chalybeous speckles between the spots; fringe white about the tip; under side with the 1st spot connected with the 2nd, and the 3rd with the 4th. Hind wings luteous, with a broad black border, which is undulating on its inner side; fringe pale luteous at the tip, white at the tip on the under side, where there is a little luteous streak in the hind part of the black border. Length of the body 8 lines; of the fore wings 25 lines. See Plate V, Fig. 1.

5. NYCTEMERA SIMPLEX. *Fœm.* Alba, gracilis, capite nigro albo-univittato; palpis nigricantibus porrectis articulo 3° lineari; antennis nigris setulosis; thorace margine antico luteo plagis quatuor vittaque postica nigris; abdomine guttis dorsalibus nigris, apice luteo; alis semihyalinis fusco marginatis; alis anticis margine fusco lato antice valde dilutato; alis posticis margine fusco sat angusto antice latiore postice intus latiore.

Female. White, slender. Head black, with a white stripe. Proboscis tawny. Palpi blackish, porrect, slender, extending somewhat beyond the head; 3rd joint linear, a little shorter than the 2nd. Antennæ black, slender, minutely setulose. Thorax with a luteous fore border; discs of the four tegulæ black; a black stripe on the hind part. Abdomen not extending beyond the hind wings, with a dorsal row of black dots; tip luteous. Legs smooth, very slender; spurs very short. Wings semihyaline, bordered with brown along the exterior border. Fore wings with the brown hue occupying more than one-third of the surface, much dilated in front. Hind wings with the brown hue much narrower, broadest in front, undulating along the inner side of its hind part. Length of the body 6 lines; of the wings 18 lines.

6. NYCTEMERA DECISA. *Mas.* Nigra; capite plaga antica alba; palpis porrectis subtus ochraceis articulo, 3° parvo acuto; antennis pectinatis apice serratis; thorace et abdomine nigricante cinereis, illius margine antico ochraceo; pectore ochraceo bivittato; ventre vittis duabus macularibus albis; alis anticis striga longitudinali latissima strigaque exteriore lata obliqua albis; alis posticis albis margine lato strigaque lanceolata apud angulum interiorum nigris, fimbria apice alba.

Male. Black. Head with a white patch on the front. Proboscis piceous. Palpi porrect, ochraceous beneath, extending a little beyond the head; 3d joint acute, minute. Antennæ moderately pectinated, serrated at the tips. Thorax and abdomen blackish cinereous, the former bordered with ochraceous in front. Pectus with two ochraceous stripes. Abdomen a little shorter than the interior border of the hind wings; under side with two macular white stripes. Femora striped with white. Wings elongate, hardly broad. Fore wings with a very broad white streak, which occupies nearly half the length from the base, and from two-thirds to four-fifths of the breadth from the interior border; a broad exterior oblique white streak in the disc. Hind wings white, bordered with black along the costa, and much more broadly so about the tips and along the exterior border; the white hue excavated, and receiving a black lanceolate streak near the interior angle; fringe white at the tip; under side with an elongated white apical spot. Length of the body 7½ lines; of the wings 24 lines. See Plate V, Fig. 2.

7. Balacra ochracea. *Mas.* Ochracea; capite pedibusque rufis; antennis nigris subserratis; abdomine alas posticae longissime superante; pedibus breviusculis, tibiis ecalcaratis, tarsis nigricantibus; alis anticis basi rufo bistrigatis; alis posticis brevissimis apice oblique truncatis.

Male. Ochraceous. Head and legs bright red. Antennæ black, stout, very minutely serrated. Abdomen extending for much more than half its length beyond the hind wings. Legs stout, rather short; tibiæ without spurs; tarsi blackish. Fore wings long, slightly rounded at the tips, with two bright red streaks which proceed from the base, and diverge from each other; exterior border rounded, extremely oblique. Hind wings obliquely truncated, not more than one-third of the length of the fore wings. Length of the body 9 lines; of the fore wings 24 lines.

The genus Balacra has been previously included in the Arctiidæ, but it rather belongs to the Zygænidæ. These two families are nearly allied, and their close affinity has been remarked by Dr Herrich-Schaeffer.

8. Leucopsumis cryptochroma. *Mas.* Nigra; capite subtus pectore ventreque luteis, vertice argenteoalbo; palpis oblique ascendentibus verticem non superantibus, articulo 3° lineari 2° dimidio breviore; antennis pectinatis apice setulosis; pedibus subtus argenteis; alis anticis striga postmedia lata obliqua alba

diaphana; alis posticis vitta discoidali cyanea, subtus luteis nigro marginatis.

Male. Black, rather stout. Head luteous beneath; vertex silvery white. Palpi obliquely ascending, not rising higher than the vertex, 3rd joint linear, much more slender than the 2nd, and less than half its length. Antennæ moderately pectinated, setulose towards the tips. Pectus luteous. Abdomen extending rather beyond the hind wings; under side luteous, with incomplete black spots on each side; apical tuft very small, very pale testaceous beneath. Legs silvery beneath. Fore wings with a broad white hyaline oblique streak in the exterior part of the disk. Hind wings with an abbreviated metallic blue stripe in the disk; under side luteous, black about the tips, and along the exterior border. Length of the body 8 lines; of the fore wings 21 lines. See Plate V, Fig. 3.

9. ALETIS POSTICA. *Mas.* Ochracea; corpore nigro; capite palpis pectoreque albis, vertice nigro albo-bivittato; thorace albo maculato et bifasciato ochraceo-unifasciato; abdomine vittis tribus macularibus ventre pedibusque albis; alis anticis dimidio exteriore nigro plagam magnam transversam maculasque duas posteriores albas includente; alis posticis macula discoidali fasciaque lata marginali strigas sex albas lanceolatas includente nigris.

Male. Ochraceous. Body Black. Head white; vertex black, with two white stripes. Proboscis pale testaceous. Palpi white. Antennæ pectinated, white above; branches short. Thorax with some white spots in front, with two white bands behind, and with a broad intermediate ochraceous band. Abdomen with three rows of white spots; under side, pectus, and legs white. Fore wings with somewhat less than half of the exterior surface black, including a large transverse white patch, and two posterior white spots. Hind wings with a black spot in the disk, and with a broad marginal black band, which includes six lanceolate white streaks. Length of the body 8 lines; of the fore wings 2 lines. See Plate V, Fig. 4.

10. PHÆGORISTA SIMILIS. *Mas.* Ochracea; capite thoraceque atris albo notatis; capite subtus palpisque ochraceis, his apice albis; abdomine fusco basi ochraceo segmentis albo fasciatis; pedibus fuscis albo vittatis; alis anticis costa linea subcostali dimi-

dioque exteriore strigam latam guttam posticam guttasque marginales albas includente nigris; alis posticis margine lato nigro alboguttato.

Male. Ochraceous. Head, proboscis, antennæ, and thorax deep black. Head white along the eyes beneath, with a white dot on each side of the front, and with an anterior white band; under side ochraceous. Palpi ochraceous, rising higher than the vertex. 3d joint deep black, linear, as long as the 2d. Antennæ moderately pectinated. Thorax with four white dots, and with six posterior white stripes. Abdomen brown, ochraceous at the base; a white band on the hind border of each segment; apical tuft very small. Legs brown, striped with white. Fore wings with a black costa and a black subcostal line; almost half the exterior surface black, including a broad oblique white streak in the disk, a white dot near the interior angle, and white marginal dots. Hind wings with a broad black border, and with marginal dots like those of the fore wings. Length of the body 9½ lines; of the fore wings 32 lines. See Plate V, Fig. 5.

Gen. SURINA.

Fœm. Corpus robustum, læve. Proboscis brevis. Palpi graciles, longissimi, verticem valde superantes; articulus 3^{us} subclavatus, 2° longior. Antennæ validæ, subtillissime pubescentes. Thorax squamosus. Abdomen alas posticas paullo superans. Pedes robusti, læves; calcaria valida. Alæ anticæ longæ, angustæ, subfusiformes, costa perparum rotundata, margine exteriore perobliquo.

Female. Body stout, smooth. Proboscis short. Palpi smooth, slender, very long, rising very high above the vertex; 3rd joint subclavate, longer than the 2nd. Antennæ stout, extremely minutely pubescent. Thorax squamous. Abdomen extending a little beyond the hind wings. Legs stout, smooth; hind tibiæ with four stout spurs, one in each pair much longer than the other. Wings long. Fore wings narrow, subfusiform, rounded at the tips; costa very slightly rounded; exterior border rounded, extremely oblique.

The greater length of the 3rd joint of the palpi, and the rounded basal part of the costa of the fore wing, distinguish this genus from *Hypsa*.

11. SURINA HYPSOIDES. *Fœm.* Pallide cinerea, subtus lutea;

capite nigro-biguttato, palpis antennisque nigricantibus; thorace nigro quadri-guttato; alis anticis bási nigro guttatis, linea flavo-alba basi dilutata apicem versus dentata et arcuata, vitta posteriore argenteo alba, spatio costali fusca, linea transversa postmedia e guttis nigris; alis posticis luteis, triente apicali fusca plagam apicalem albam includente.

Female. Pale cinereous, luteous beneath. Head with two black dots between the antennæ. Proboscis testaceous. Palpi and antennæ blackish. Thorax with two black dots on each of the fore tegulæ, and with two on each of the hind tegulæ. Abdomen luteous, with three rows of black dots. Legs luteous. Fore wings with some black dots near the base, a yellowish white line extending from the base of the costa, where it is dilated, slightly dentate and curved in its exterior part, and ending near the tip of the wing; space between the line and the costa brown; a silvery white stripe bordering the antemedial hind side of the above line; a black guttular postmedial line extending from the end of the stripe to the interior border; under side with the exterior half, brown. Hind wings luteous; apical third part brown, including an apical white patch. Length of the body 12 lines; of the fore wings 35 lines.

12. HYPSA DISSOCIATA. *Fœm.* Fusca; capite albo nigro-quadrimaculato; thorace fasciis tribus macularibus maculisque quatuor posterioribus nigris, abdomine ochraceo, vitta interrupta nigra; alis anticis atomis plaga costali lineaque exteriore transversa angulosa albis, lineis tribus transversis e guttis nigris; alis posticis ochraceis fascia lata marginali cinereofusca.

Female. Brown. Head and thorax white. Head with four black spots, one on each side of the vertex, and one on each side of the front; frontal tuft black beneath. Rostrum testaceous. Antennæ black, smooth. Thorax with three black bands, and with four posterior black spots, two of the latter on each side; 1st band interrupted in the middle; 2nd composed of two transverse streaks, and of two intermediate spots; 3rd of four black spots. Pectus cinereous. Abdomen ochraceous, extending rather beyond the hind wings, with a black stripe, which is interrupted on the hind border of each segment, and is dilated at the tip. Legs blackish; femora and tibiæ fringed; tarsi with white dots. Wings long, narrow, fringed with whitish marks. Fore wings

rounded at the tips, with white speckles, with a white costal patch at a little beyond the middle, and with a slight transverse zig-zag white line near the exterior border; some black dots on the veins forming three irregular transverse lines—1st very near the base; 2nd antemedial; 3rd oblique, postmedial; under side cinereous-brown, with a broad ochraceous streak along the basal part of the interior border; exterior border slightly rounded, very oblique. Hind wings ochraceous, with a broad marginal cinereous-brown band, which extends along the exterior border, and is broadest at the tip. Length of the body 9 lines; of the wings 28 lines.

Gen. ZARACHA.

Mas. Corpus robustum. Proboscis nulla. Palpi robusti, porrecti; caput vix superantes; articulus 3^{us} minimus. Antennæ subserratæ, triente basali subincrassatæ et late pectinatæ. Abdomen alas posticas longe superans, piles longissimis vestitum; fasciculus apicalis minimus. Pedes sat validi; femora et tibiæ subfimbriata; calcaria brevia. Alæ longæ, angustæ; anticæ apice rotundatæ, margine exteriore convexo perobliquo.

Male. Body stout. Proboscis obsolete. Palpi stout, porrect hardly extending beyond the head; 3rd joint extremely minute. Antennæ minutely serrated, slightly incrustated, and broadly pectinated for one-third of the length from the base. Abdomen clothed with long hairs, extending much beyond the hind wings; apical tuft very small. Legs rather stout; femora and tibiæ slightly fringed; spurs short. Wings long, narrow. Fore wings rounded at the tips; exterior border rounded, extremely oblique; anal vein united with the subanal vein at a short distance from the base.

13. ZARACHA EXTRANEA. *Mas.* Fusca, capite fronte albo, vertice palpis antennis que nigris; thorace margine antico ochraceo, tegulis anticis albis nigro unimaculatis; pectore abdomineque ochraceis, hoc vitta dorsali fusca interrupta; pedibus nigris, femoribus ochraceo pilosis; alis anticis venis basalibus fasciaque obliqua abbreviata albis; alis posticis ochraceis gutta discoidali nigra, fascia marginali lata fusca.

Male. Brown. Head white above; vertex, palpi, and antennæ black. Thorax bordered with ochraceous in front; fore tegulæ white, each including a black spot. Pectus and abdomen ochraceous, the latter with an interrupted brown dorsal stripe. Legs black; femora with ochraceous hairs. Fore wings with the veins white at the base; an abbreviated oblique white band at three-fourths of the length, dilated in front. Hind wings ochraceous, with a black dot in the disk, and with a broad brown marginal band. Length of the body 8 lines; of the wings 21 lines.

14. SOLOE QUADRIGUTTATA. *Mas.* Ochracea, gracilis; palpis latissimis erectis verticem paullo superantibus articulo 3° minimo; abdomine alas posticas longe superante, basi cervino, fasciculo apiculi longo nigricante; tibiis tarsisque anticis nigricantibus; alis macula discoidali nigra; alis anticis cervinis; alis posticis albidis, plaga apicali fusca.

Male. Ochraceous, slender. Proboscis moderately long. Palpi very broad, erect, rising a little higher than the vertex; 3rd joint extremely small. Abdomen fawn colour towards the base, extending much beyond the hind wings; apical tuft blackish, elongated. Legs long, smooth, slender; spurs long, slender; fore tibiæ and fore tarsi blackish. Wings with a black discoidal spot. Fore wings fawn colour, slightly acute; exterior border rounded, very oblique. Hind wings whitish, with a brown apical patch; discoidal spot smaller than that of the fore wings. Length of the body 7 lines; of the wings 16 lines.

15. BARSINE INDECISA. *Mas.* Ochracea, subtus pallide lutea; palpis porrectis brevissimis gracillimis; antennis serratis; abdomine alas posticas non superante, sexualibus longis; alis anticis apice rotundatis, fasciis quatuor aut quinque obliquis macularibus purpureo rufis, disco subtus purpurascente; alis posticis flavis.

Male. Ochraceous; under side and abdomen pale luteous. Proboscis slender. Palpi porrect, very short and slender, not extending to the front of the head. Antennæ serrated, setulose. Abdomen not extending beyond the hind wings; apical appendages long. Legs smooth, rather stout; hind tibiæ with four short slender spurs. Fore wings rounded at the tips, with four or five oblique indistinct macular purplish red bands; exterior border rounded, very oblique; under side with a purplish disk. Hind wings yellow. Length of the body 3 lines; of the wings 9½ lines.

16. SPILOSOMA RAMIVITTA. *Mas.* Alba; palpis nigris basi albis;

antennis nigris sat late pectinatis; thorace nigro-sexmaculato; abdomine dorso ochraceo vittis tribus guttularibus nigris, segmento 1° albotrinotato, lineis duabus ventralibus punctularibus nigris; pedibus luteo nigroque variis; alis anticis vitta media fusca ramos emittente albo maculata et guttata; alis posticis macula subcostali maculisque tribus submarginalibus fuscis.

Male. White. Palpi porrect, black except at the base, extending somewhat beyond the head; 3rd joint conical, less than one-fourth of the length of the 2nd. Antennæ black, rather broadly pectinated. Thorax with six black spots, one in the fore part, and one in the hind part of the disk, and one on each of the four tegulæ. Abdomen extending rather beyond the hind wings, ochraceous above, with three stripes of black dots; 1st segment white on each side, and with a white longitudinal middle streak; under side with two lines of black points. Legs partly tinged with luteous; tarsi and four anterior tibiæ black; hind tibiæ with a black subapical streak. Wings elongate. Fore wings rounded at the tips, with a brown middle stripe, which emits branches to the costa and to the interior border, and is dilated along its exterior part, and there contains some white spots and dots, and emits streaks to the exterior border. Hind wings with a brown subcostal spot, and with three brown spots near the exterior border. Length of the body 8 lines; of the wings 20 lines.

Gen. Sciatta.

Mas. Corpus sat robustum. Caput subproductum, antice rotundatum. Proboscis subobsoleta. Palpi porrecti, sat graciles, caput non superantes; articulus 3^{us} parvus, acutus. Antennæ breves, validæ, serratæ. Abdomen alas posticas sat superans, sexualibus magnis. Pedes breves, tibiis breviter calcaratis. Alæ longæ, angustæ; anticæ apice rotundatæ margine exteriore subconvexo perobliquo.

Male. Body rather stout. Head prominent and rounded in front. Proboscis rudimentary. Palpi porrect, rather slender, not extending beyond the head; 3rd joint acute, not more than one-fourth of the length of the 2nd. Antennæ short, stout, serrated. Abdomen extending somewhat beyond the hind wings; a hooked appendage above, and two lateral valves at the tip. Legs short, moderately stout, spurs short. Wings long, narrow. Fore wings rounded at the tips; exterior border slightly rounded, very oblique; 2nd inferior vein a little nearer to the 1st than to the 3rd.

17. SCIATTA INCONCISA. *Mas.* Alba; thorace antice ochraceo-fasciato; abdomine ochraceo vittis tribus macularibus nigris; alis anticis macula basali fascia antemedia plagisque exterioribus ochraceis; alis posticis fascia marginali ochracea informi valde interrupta.

Male. White. Thorax with a narrow ochraceous band on the fore tegulæ. Abdomen ochraceous, with three stripes of black spots. Tarsi with black bands. Fore wings with an ochraceous spot at the base, with an ochraceous antemedial band, which is much dilated towards the interior border, and with some ochraceous exterior patches, of which the largest is costal. Hind wings with an irregular and much interrupted ochraceous marginal band. Length of the body 6 lines; of the wings 17½ lines.

18. ARTAXA SQUAMIPLAGA. *Mas.* Pallide ochracea; palpis porrectis caput longe superantibus; antennis sat late pectinatis; thorace pilis longis vestito; alis anticis lineis duabus transversis obliquis undulatis saturate ochraceis, plaga diffusa e squamis atris.

Male. Pale ochraceous. Palpi slender, porrect, extending much beyond the head; 3rd joint conical, not more than one sixth of the length of the 2nd. Antennæ short, rather broadly pectinated. Thorax clothed with long hairs. Abdomen a little shorter than the interior border of the hind wings; apical tuft rather large. Fore wings with two deep ochraceous transverse oblique undulating lines, a diffuse patch of deep black speckles between the lines, and a few speckles of the same hue beyond the 2nd line. Length of the body 5 lines; of the wings 15 lines.

Gen. ZARFA.

Mas. Corpus robustum. Caput bifasciculatum. Palpi graciles, porrecti, caput paullo superantes; articulus 3^{us} lancolatus. Antennæ late pectinatæ, thorace breviores. Abdomen basi fasciculatum, alas posticas non superans; fasciculus apicalis brevis. Pedes breves, fimbriati. Alæ anticæ longiusculæ, sat angustæ, apice valde rotundatæ, margine exteriore convexo perobliquo.

Male. Body stout. Head with a tuft on each side at the base of the antennæ. Palpi slender, porrect, extending a little beyond the head; 3rd joint lanceolate, more slender than the 2nd, and not more than one-fourth of its length. Antennæ broadly pectinated, shorter than the thorax. Abdomen tufted above at the base, not extending beyond the hind wings; apical tuft short. Legs short; femora and tibiæ fringed. Fore wings rather long and narrow, much rounded at the tips; exterior border rounded, very oblique.

19. Zarfa lunifera. *Mas.* Albo, capite apud oculos ochraceo; antennarum ramis fulvis thorace abdominis que crista pallide lutescentibus; tarsis nigro fasciatis; alis anticis testaceo albis, margine lunula que fusco marginata nigro biguttata pallide luteis, punctis discoidalibus nigris, linea marginali interrupta argenteo alba.

Male. White. Head ochraceous along the eye on the outer side. Antennæ with tawny branches. Thorax, except in front and crest of the abdomen, with a pale luteous tinge. Tarsi with black bands. Fore wings testaceous white, bordered with pale luteous; a pale luteous brown bordered lunule across the tip of the areolet, with a black dot at each end; some black points on the median vein; an interrupted silvery white line along the exterior border. Length of the body 8 lines; of the wings 23 lines.

Gen. Sizalisca.

Mas. Corpus crassum. Proboscis nulla. Palpi porrecti, dense pilosi, caput vix superantes; articulus 3^{us} brevissimus. Antennæ breves, late pectinatæ, apice serratæ. Abdomen alas posticas sat superans; fasciculus apicalis longus. Pedes breves, fimbriati; tibiæ posticæ calcaribus duobus parvis apicalibus. Alæ anticæ longæ, apice rotundatæ, margine exteriore convexo perobliquo.

Male. Body thick. Proboscis obsolete. Palpi porrect, densely clothed with short hairs, hardly extending beyond the head; 3rd joint extremely short. Antennæ short, broadly pectinated to four-fifths of the length, minutely serrated from thence to the tips. Abdomen extending somewhat beyond the hind wings; apical tuft elongate. Legs short; femora and tibiæ fringed; hind tibiæ with two short apical spurs. Wings elongate. Fore wings rounded at the tips; exterior border rounded, very oblique.

20. **Sizalisca graminosa.** *Mas.* Herbida, subtus cinereo fulva; palpis nigris apice pallide cinereis; antennis cinereis ferrugineo ramosis; abdomine cinereo cervino vitta lata fasciculo que apicali viridibus; alis anticis nigro conspersis, lineis quatuor transversis angulosis liturisque marginalibus nigris, plaga discoidali fusca; alis posticis cinereo-cervinis.

Male. Grass green, cinereous fawn colour beneath. Palpi black, pale cinereous towards the tips. Antennæ cinereous, with ferruginous branches. Abdomen cinereous fawn colour, with a broad green stripe; apical tuft wholly green. Femora and tibiæ thickly clothed with green hairs. Fore wings thickly and minutely black speckled; two antemedial and two postmedial zig-zag transverse black lines; an intermediate brown patch in the disk; a row of irregular black marginal marks; fringe cinereous, with black spots. Hind wings cinereous fawn colour. Length of the body 10½ lines; of the wings 27 lines.

Gen. Viana.

Mas. Corpus sat gracile. Caput sat magnum, thorace arcte insertum. Proboscis nulla. Palpi validi, porrecti, subpilosi, caput paullo superantes; articulus 3^us^ acutus, brevissimus. Antennæ breviusculæ, late pectinatæ. Abdomen breve; fasciculus apicalus longus, subcompressus. Pedes breves, graciles, femoribus tibiis que subfimbriatis, tibiis posticis apice bicalcaratis. Alæ anticæ latæ, apice subrotundatæ, margine exteriore convexo subobliquo, areola discoidali brevi. Alæ posticæ abdomen longæ superantes, margine exteriore subangulato.

Male. Body rather slender. Head rather large, deeply inserted in the thorax. Proboscis obsolete. Palpi stout, porrect, clothed with short hairs, extending a little beyond the head; 3rd joint acute, very short. Antennæ rather short, broadly pectinated; joints very short. Abdomen much shorter than the interior border of the hind wings; apical tuft elongate, slightly compressed. Legs short, slender; femora and tibiæ thinly fringed; hind tibiæ with two long slender apical spurs. Wings broad. Fore wings more thickly clothed at the base, slightly rounded at the tips; exterior border rounded, slightly oblique; discoidal areolet near the costa, extending to somewhat beyond one-third of the length; 2nd median nervule very slightly more remote from the 3rd than from the 1st. Hind wings most thickly clothed along the interior border; exterior border slightly angular in the middle.

21. VIANA VELUTINA. *Mas.* Cervina; corpore subtus palpis subtus pedibusque albido testaceis; alis anticis linea postmedia nigricante obliqua fere recta intus concisa extus diffusa; alis posticis ochraceis, linea transversa arcuata fuscescente extus diffusa, spatio exteriore margineque interiore cervinis.

Male. Fawn colour. Body, palpi beneath, and legs whitish testaceous. Fore wings with a blackish oblique nearly straight postmedial line, which is concise on the inner side, and diffuse on the outer side. Hind wings ochraceous, except along the interior border, for full two-thirds of the length from the base, this line bounded by a curved brownish line, which is diffuse on the outer side. Length of the body 6½ lines, of the fore wings 21 lines.

Gen. VAENA.

Fœm. Corpus sat robustum. Caput parvum, thorace arcte insertum; frons plana. Proboscis brevissima, gracillima. Palpi porrecti, brevissimi, gracillimi, caput non superantes; articulus 3^{us} minimus. Antennæ glabræ. Abdomen alas posticas paullo superans. Pedes læves, breves, graciles; femora sulcata; calcaria parva. Alæ, anticæ longæ, acutæ, costa perparum convexa, margine exteriore angulato antice recto subobliquo postice excavato perobliquo. Alæ posticæ apice fere rectangulatæ.

Female. Body rather stout. Head small, deeply inserted in the thorax; front flat. Proboscis very short and slender. Palpi porrect, very short and slender, not extending beyond the head; 3rd joint extremely minute. Antennæ smooth. Abdomen extending a little beyond the hind wings. Legs smooth, short, slender; femora grooved; hind tibiæ with four short spurs. Wings moderately broad. Fore wings long, acute; costa very slightly rounded; exterior border angular in the middle, its fore half straight and slightly oblique, its hind half concave and very oblique. Hind wings nearly rectangular at the tips; interior border receding from the abdomen.

22. VAENA EACLEOIDES. *Fœm.* Lutea; thorace purpureo-rufo; alis gutta discoidali nigra, atomis fasciisque tribus obliquis inde-

terminatis purpureo rufis; alis anticis fasciis 1ª et 2ª confusis; alis posticis fascia 3ª marginali valde interrupta.

Female. Luteous. Eyes black. Thorax purplish red. Wings with a black discoidal dot, with purplish red speckles, and with two oblique, very irregular purplish red bands, which are confused together in the fore wings; a third exterior and more oblique purplish red band, which is marginal and much interrupted in its hind wings. Fore wings with the 3rd band apparent on the underside. Hind wings with the 2nd band visible beneath. Length of the body 5 lines; of the fore wings 15 lines.

23. PŒCILOCAMPA SUBLINEATA. *Fœm.* Ferrugineo rufa, subtus cinereo rufa; capite antice fasciculato; palpis porrectis brevissimis; antennis serratis; abdomine alas posticas paullo superante; pedibus brevibus, gracilibus, femoribus tibiis que pilosis; alis fascia obliqua nigricante; alis anticis apice rotundatis, gutta discoidali antemedia alba, fascia media obliqua nigricante.

Female. Ferruginous red, cinereous red beneath. Body densely pilose. Head deeply inserted in the thorax, tufted in front. Palpi porrect, hardly extending beyond the hairs; 3rd joint lanceolate. Antennæ serrated. Abdomen extending a little beyond the hind wings. Legs short, slender; femora and tibiæ pilose; spurs slender. Wings with an oblique blackish band which extends from near the tips of the fore wings to the outer part of the interior border of the hind wings. Fore wings rounded at the tips, with an oblique blackish middle band, and with an antemedial discoidal white dot; 3rd inferior vein, or median nervule, very remote from the 2nd; exterior border rounded, slightly oblique. Length of the body 6 lines; of the wings 18 lines.

24. NYSSIA RUDIS. *Mas* et *Fœm.* Ochracea, crassa, capite supra thorace abdomineque basi viridibus; alis anticis nigro-conspersis, fascia viridi informi obliqua antice dilatata. *Mas.* Antennis subserratis basi pectinatis.

Male and *Female.* Ochraceous, very stout. Head above, thorax and base of the abdomen grass green. Antennæ of the male slightly serrated, moderately pectinated from the base to one-third of the length. Abdomen of the male extending somewhat beyond the hind wings. Legs very hairy. Fore wings with black speckles, and with an irregular oblique grass green band, which is dilated on its anterior half, and extends from one-third of the length of the interior border to somewhat beyond the middle of the costa; exterior border slightly rounded, very oblique. Length of the body 9–11 lines; of the wings 27–30 lines.

Gen. ZINARA.

Mas. Corpus robustum. Proboscis nulla. Palpi validi, vix ascendentes, caput paullo superantes; articulus 3^{us} lanceolatus. Antennæ breves, late pectinatæ, apice versus simplices. Thorax squamosus. Abdomen alas posticas perpaullo superans; fasciculus apicalis spissus, vix productus. Pedes validi; calcaria longa. Alæ anticæ apice rotundatæ, margine exteriore convexo perobliquo.

Male. Body stout. Proboscis obsolete. Palpi stout, hardly ascending, extending a little beyond the head; 3rd joint lanceolate, not more than one-fourth of the length of the 2nd. Antennæ short, broadly pectinated to beyond half the length. Thorax squamous. Abdomen extending very little beyond the hind wings; apical tuft compact, slightly elongate. Legs stout; spurs long. Wings moderately broad. Fore wings rounded at the tips; exterior border rounded, very oblique.

25. ZINARA NERVOSA. *Mas.* Ferruginea, subtus cinerea; alis anticis atomis striga basili transversa arcuata plagaque antemedia cinereo submarginata nigris, linea postmedia transversa venisque exterioribus cinereis; alis posticis cinereis.

Male. Ferruginous, cinereous beneath. Thorax mostly blackish. Fore wings irregularly black-speckled, with a curved transverse black streak near the base; an antemedial black patch near the interior border, broadly and irregularly bordered with pale cinereous on the outer side; a postmedial transverse pale cinereous line which does not extend to the costa; exterior veins pale cinereous; under side mostly blackish in front. Hind wings cinereous; under side with some black speckles in front. Length of the body 3½ lines; of the wings 10 lines.

26. ANTHERÆA RHODOPHILA. *Fœm.* Ferrugineo fusca; corpore subroseo, capite thoracisque tegulis anticis roseis; antennis nigris subserratis; alis basi roseis, lineis duabus obliquis albidis, 2^{a}

fusco marginata, alis anticis subfalcatis linea 1° angulosa purpurascente suffusa, striga costali lata albida, macula discoidali angulata vitrea, alis posticis ocello magno ochraceo nigro roseo alboque marginato guttam vitream angulatam includente, margine exteriore subangulato.

Female. Ferruginous brown. Body dull rose colour. Head and fore tegulæ of the thorax brown, the latter bordered in front and behind with rose colour. Antennæ black, minutely serrated. Abdomen somewhat more than half the length of the interior border of the hind wings. Tibiæ and tarsi black. Wings with a rosy tinge at the base, with an antemedial oblique whitish line, and with a postmedial more oblique whitish line, which is bordered with brown on the outer side; these markings are indistinct on the under side. Fore wings rounded at the tips, hardly falcate, with a broad whitish streak which extends along the costa from the inner side of the postmedial line; antemedial line zig-zag, with a purplish tinge; an angular moderately large vitreous spot in the disk. Hind wings with a large ochraceous ocellus in the disk; this ocellus includes an angular vitreous dot, and is bordered with black, then with rose colour, and lastly with white; exterior border slightly angular in the middle. Length of the body 11 lines; of the wings 54 lines.

27. ANTHERÆA INTERMISCENS. *Fœm.* Lutescente viridis; thoracis tegulis albido marginatis; abdomine cinereo; alis lineis duabus obliquis nigricantibus fasciis que duabus latis indeterminatus purpureo albidis, linea 2° albido marginata; alis anticis viæ falcatis macula discoidali vitrea angulata, alis posticis ocello saturate ochraceo guttam vitream includente atro viridescente et purpureo albo-marginato, margine exteriore subconvexo.

Female. Dull luteous green. Tegulæ of the thorax with whitish borders. Abdomen with cinereous hairs, much shorter than the interior border of the hind wings. Wings with two oblique blackish lines, each having along its outer side a broad irregular purplish whitish band; 2nd line narrowly bordered with whitish on its inner side; under side very broadly cinereous towards the base, and with an exterior dentate oblique cinereous band, which is macular in the fore wings. Fore wings very slightly acute, hardly falcate, with an angular vitreous spot between the lines, which are nearly straight. Hind wings with the lines undulating, the outer one contiguous to a large intermediate deep ochraceous ocellus, which includes a vitreous dot, and is bordered with deep black, and with pale dull green, and lastly with purplish white; exterior border slightly rounded. Length of the body 16½ lines; of the wings 62 lines. See Plate VI, Fig. 6.

Gen. TACHOSA.

Mas et *Fœm.* Corpus robustum. Caput fasciculo frontali brevissimo. Proboscis valida. Palpi robusti, erecti, verticem perpaullo superantes; articulus 3^{us} linearis, graciles, 2^{i} dimidio brevior. Pedes vix robusti; femora subfimbriata; calcaria longa, gracilia. Alæ anticæ sat angustæ, apice subrotundatæ, margine exteriore convexo subobliquo. *Mas.* Antennæ setosæ, apices versus glabræ. Abdomen alas posticas longe superans; fasciculus apicalis longus, compressus. *Fœm.* Antennæ glabræ. Abdomen non elongatum.

Male and *Female.* Body stout. Head with a very short frontal tuft. Eyes large, prominent. Proboscis robust, moderately long. Palpi stout, erect, rising very little higher than the vertex; 3rd joint linear, rounded at the tip, much more slender than the 2nd, and about one-third of its length. Antennæ slender, setose for two-thirds of the length in the male, smooth in the female. Abdomen tapering, extending very much beyond the hind wings in the male, shorter in the female; apical tuft of the male long, compressed. Legs hardly stout; femora slightly fringed; spurs long, slender. Wings rather narrow. Fore wings slightly rounded at the tips; exterior border rounded, slightly oblique; 1st, 2nd, and 3rd inferior veins approximate at the base; 4th remote.

28. TACHOSA ACRONYCTOIDES. *Mas* et *Fœm.* Cana capite fusco-fasciato; palpis fusco fasciatis; thorace fascia antica fusca; abdomine cinereo pilis basalibas longis; alis anticis nigro conspersis, fusco nebulosis, lineis tribus nigris angulosis, 1^{a} abreviata, 2^{a} ramum emittente, 3^{a} albo submarginata, punctis marginalibus nigris, alis posticis fuscis, basi cinereis et subhyalinis.

Male and *Female.* Hoary, cinereous beneath. Head with a narrow brown band on the vertex. 2nd and 3rd joints of the palpi brown, hoary at the base and at the tip. Thorax with a brown band on the fore tegulæ. Abdomen cinereous, with long hairs at the base. Fore wings black speckled, clouded with brown; three irregular zig-zag black lines; 1st line very near the base, not extending to the interior border; 2nd antemedial, emitting an oblique branch to the 3rd, which is postmedial, and partly white bordered; marginal points black. Hind wings brown, cinereous and slightly hyaline towards the base. Length of the body 8–9 lines; of the wings 18 lines.

29. TACHOSA METAPHÆARIA. *Fœm* Cinerea, subtus cervina; palpis nigris oblique ascendentibus verticem non superantibus, articulo 3° lineari basi apice que albo, thorace fusco-quadrimaculato tegulis anticis nigricante marginatis, abdomine alisque posticis cervinis, alis anticis striga transversa basali annulo interrupta linea antemedia transversa undulata maculis tribus lineaque exteriore transversa angulosa fuscis, linea postmedia angulosa palide fusca, guttis apud lineam exteriorem guttisque marginalibus nigris, spatiæ marginali pallide fusco lineam albidam transversam angulosam includente.

Female. Cinereous, fawn colour beneath. Palpi black, smooth, moderately stout, obliquely ascending, not rising higher than the vertex; 2nd joint white at the tip; 3rd linear, white at the base and at the tip, less than half the length of the 2nd. Antennæ slender. Fore tegulæ of the thorax narrowly bordered with blackish in front; two brown spots on each of the hind tegulæ. Abdomen and hind wings fawn colour, the former hardly extending beyond the latter. Legs cinereous, stout; femora and tibiæ fringed; tips of the latter and of the joints of the tarsi whitish; spurs long, slender. Fore wings slightly rounded at the tips; a dark brown transverse streak near the base, joining an incomplete dark brown ringlet in the disk; an antemedial transverse undulating brown line accompanied by two dark brown spots, one costal, the other discoidal; a zig-zag pale brown slightly postmedial transverse line, with a dark brown discoidal spot on its inner side; an exterior transverse zig-zag brown line accompanied by black dots; space from thence to the exterior border pale brown, including a zig-zag transverse white line; marginal dots black. Length of the body 6 lines; of the wings 17½ lines.

Gen. TUERTA.

Mas. Corpus cylindricum, sat validem. Caput et thorax dense squamoso-pilosa. Proboscis mediocris. Palpi robusti, squamoso hirti, suberecti, verticem non superantes; articulus 3^{us} conicus. Antennæ robustæ, glabræ. Abdomen alas posticas paullo superans; dorsum cristatum; fasciculus apicalis spissus, elongatus. Pedes fimbriati, sat graciles; calcaria gracilia. Alæ anticæ longæ, apice subrotundatæ, margine exteriore rotundo sat obliquo.

Male. Body cylindrical, moderately stout. Head and thorax thickly clothed with squamous hairs. Proboscis moderately long. Palpi stout, thickly clothed with squamous hairs, nearly erect, applied to the head, not rising higher than the vertex; 3rd joint conical, not more than one-sixth of the length of the 2nd. Antennæ stout, smooth. Abdomen extending a little beyond the hind wings, with dorsal crests, and with a large elongate apical tuft. Legs rather slender; femora and tibiæ fringed; spurs slender, moderately long. Wings elongate. Fore wings slightly rounded at the tips; exterior border rounded, rather oblique; 4th inferior vein remote from the other three, which are approximate to each other.

30. TUERTA CHRYSOCHLORA. *Mas.* Obscure ferrugineo fusca, subtus ochracea; antennis nigris; abdomine ochraceo nigro-cristato; alis anticis cinereo conspersis plaga maxima pallide viridi; alis posticis ochraceis fusco late marginatis fimbria pallide cinerea.

Male. Dark ferruginous brown, ochraceous beneath. Antennæ black. Abdomen ochraceous, with small black crests. Fore wings cinereous-speckled, with a very large pale green patch, which extends along the costa from the base to three-fourths of the length, and is widest beyond its middle, where it occupies three-fourths of the breadth of the wing. Hind wings ochraceous, with a broad brown border; fringe pale cinereous. Length of the body 8 lines; of the wings 20 lines. See Plate VI, Fig. 7.

Gen. PETRINIA.

Fœm. Corpus robustum. Proboscis mediocris. Palpi sat graciles, oblique ascendentes, verticem non superantes; articulus 3^{us} lanceolatus 2^{i} dimidio brevior. Antennæ graciles. Abdomen alas posticas paullo superans. Pedes sat validi; calcaria longa, gracilia. Alæ anticæ apice rotundatæ, margine exteriore convexo perobliquo.

Female. Body stout. Proboscis moderately long. Palpi rather slender, obliquely ascending, not rising higher than the vertex; 3rd joint lanceolate, less than half the length of the 2nd. Antennæ slender. Abdomen extending a little beyond the hind wings. Legs rather stout; spurs long, slender. Wings moderately broad. Fore wings rounded at the tips; exterior border rounded, its hind part very oblique; 1st, 2nd, and 3rd inferior veins approximate at the base; 4th remote.

31. PETRINIA LIGNOSA. *Fœm.* Cervina, subtus cinerea, thorace fusco-trifasciato, alis anticis margine costali fasciis duabus angulosis lineaque submarginali fracta atro marginata pallide testaceis, fascia 1° informi apud medium dilatata, 2°· lineam angulatam emittente, atomis non nullis subcostalibus guttaque discoidali atris; alis posticis cinereo-fuscis.

Female. Fawn colour, cinereous beneath. Thorax with three dark brown bands. Fore wings pale testaceous along the costa at the base, and with two pale testaceous zig-zag bands; 1st band antemedial, very irregular, dilated in the middle; 2nd postmedial, emitting from its inner side an angular line which proceeds towards the costa; a submarginal dislocated pale testaceous line irregularly bordered with deep black; a testaceous marginal festoon; some deep black subcostal speckles, and a deep black discoidal dot. Hind wings cinereous brown; fringe pale cinereous. Length of the body 6 lines; of the wings 16 lines.

32. AGROTIS HEMILEUCA. *Mas.* Fusca, subtus sordide alba; palpis robustis perparum ascendentibus caput superantibus, articulo 2° extus nigricante, 3° conico; antennis sat late pectinatis apice simplicibus; thorace nigro unifasciato; abdomine sordide albo alas posticas sat superante fasciculo apicali fulvo; alis anticis lineis tribus nigris transversis angulosis, fascia diffusa striga longitudinali interrupta guttisque marginalibus nigricantibus, orbiculari et reniformi nigro marginatis; alis posticis niveis.

Male. Ferruginous brown, dingy white beneath. Palpi stout, very slightly ascending, extending somewhat beyond the head; 2nd joint blackish on the outer side; 3rd conical, not more than one-fourth of the length of the 2nd. Antennæ rather broadly pectinated, except near the tips. Thorax with a black band on the fore tegulæ. Abdomen dingy white, extending rather beyond the hind wings; apical tuft tawny. Legs brown; tips of the tarsal joints white. Fore wings with three zig-zag transverse black lines, and with a diffuse blackish band between the 2nd and 3rd lines; a blackish longitudinal streak between the 2nd and 3rd lines, interrupted by the black-bordered orbicular and reniform marks which have the usual form; three whitish costal points near the tip; marginal dots blackish. Hind wings pure white. Length of the body 7 lines; of the wings 16 lines.

33. AGROTIS CATENIFERA. *Fœm.* Fusca, subtus cinerea; palpis oblique ascendentibus verticem non superantibus, articulo 3° conico, abdomine cinereo alas posticas sat superante; alis anticis linea basali dimidio exteriore dilatata punctis que submarginalibus et marginalibus nigris, striga discoidali interrupta nigricante, orbiculari et reniformi magnis nigro marginatis hujus disco nigricante cinereo; alis posticis cinereis basi albidis.

Female. Brown, cinereous beneath. Palpi obliquely ascending, not rising higher than the vertex; 3rd joint conical, about one-sixth of the length of the 2nd. Abdomen cinereous, extending rather beyond the hind wings. Fore wings with a black line which extends from the base, and is dilated along its outer half, and terminates behind the orbicular mark; a blackish streak in the disk interrupted by the orbicular and reniform marks, which are large and black bordered, and of the usual form; disk of the reniform blackish cinereous; a transverse line of black points nearer to the exterior border than to the reniform; marginal points black. Hind wings cinereous, whitish towards the base. Length of the body 9 lines; of the wings 19 lines.

Gen. TAVILA.

Mas. Corpus breve, sat robustum. Proboscis mediocris. Palpi graciles, erecti, verticem paullo superantes; articulus 3^{us} lanceolatus, 2° duplo brevior. Antennæ setulosæ. Thoraceis tegulæ anticæ breves. Abdomen alas posticas sat superans; fasciculus apicalis parvus, subcompressus. Pedes breves, graciles; calcaria longa, gracilia. Alæ anticæ latæ, apice subrotundatæ, plaga subtus basali squamosa glabra, costa apud medium subdilatata.

Male. Body smooth, moderately stout. Proboscis of the usual length. Palpi slender, erect, rising a little higher than the vertex; 3rd joint lanceolate, about half the length of the 2nd. Antennæ minutely setulose. Fore tegulæ of the thorax short.

Abdomen extending somewhat beyond the hind wings; apical tuft small, slightly compressed. Legs smooth, slender; spurs long, slender. Wings broad. Fore wings slightly rounded at the tips; costa slightly dilated in the middle; exterior border slightly rounded and oblique; under side with a smooth squamous patch in the disk near the base; 2nd inferior vein equally remote from the 1st and from the 3rd; 3rd thrice further from the 4th than from the 2nd.

34. TAVILA INDETERMINATA. *Mas.* Pallide straminea, palporum articulo 2° nigro-vittato, antennis fulvis, thoraceis tegulis anticis ochraceis, alis anticis postice pallidissime cervinis, lineis duabus transversis connexis pallide fuscis, 1° angulosa, 2° valde flexa.

Male. Pale straw colour. Second joint of the palpi with a black stripe along the outer side. Antennæ tawny. Fore tegulæ of the thorax ochraceous. Fore wings with two pale brown transverse lines; 1st line antemedial, zig-zag, connected on the costa with the 2nd, which is much bent outward; hind half very pale fawn colour. Length of the body 5 lines; of the wings 11 lines.

35. ERASTRIA DECORA. *Mas.* Cinerea; corpore subtus, palpis subtus pedibusque argenteo albis; palpis oblique ascendentibus, articulo 2° squamoso fimbriato, 3° lanceolato; thorace pallide roseo, tegulis anticis cinereis, alis anticis lineis transversis nigris undulatis albo marginatis, macula basali fasciaque media antice inordinatim dilatata maculamque nigram costalem includente, linea postmedia transversa alba angulosa, maculisque tribus exterioribus pallide roseis, strigis exterioribus nigris; alis posticis apud marginem interiorem lituratis.

Male. Cinereous. Body beneath, palpi beneath, and legs silvery white. Palpi obliquely ascending; 2nd joint with a short squamous fringe; 3rd lanceolate, more than half the length of the 2nd. Antennæ smooth, stout. Thorax pale rose colour; fore tegulæ cinereous. Fore wings with a few black undulating transverse white-bordered lines; a pale rose-coloured spot near the base, and a pale rosy middle band, which is excessively dilated in front, and includes a black costal spot; an exterior zig-zag white line, which is accompanied by three pale rosy spots, and by some more exterior black streaks. Hind wings with markings near the interior border, like those of the fore wings. Length of the body 3½ lines; of the fore wings 10 lines.

36. HYDRELIA TERMINATA. *Fœm.* Cinerea; palpis squamoso fimbriatis oblique ascendentibus verticem non superantibus, articulo 3° lanceolato; abdomine alas posticas paullo superante; alis anticis purpurascente chalybæo et viridescente subtinctis apice subrotundatis, fascia marginali fusca intus valide rotundata; alis posticis pallide fuscis.

Female. Cinereous, rather stout. Proboscis long, stout. Palpi slender, obliquely ascending, not rising higher than the vertex, with a squamous fringe; 3rd joint lanceolate, more than half the length of the 2nd. Antennæ slender. Abdomen extending a little beyond the hind wings. Fore wings slightly rounded at the tips, with an indistinct purplish and chalybeous and pale greenish tinge; a brown marginal band, which is much dilated and rounded on the inner side; exterior border slightly rounded, hardly oblique. Hind wings pale brown above. Wings beneath with a brown discoidal dot, and a brown marginal festoon. Length of the body 4½ lines; of the fore wings 11 lines.

37. MICRA CONVERGENS. *Mas.* Pallidissime testacæa subtus albida; palpis porrectis caput longe superantibus, articulo 3° lanceolato; alis anticis acutis, apud marginem exteriorem fusco pallido nebulosis, lineis quatuor obliquis fuscis, 3° et 4° versus marginem exteriorem testaceo pallido marginatis; alis posticis albidis.

Male. Very pale testaceous, whitish beneath. Palpi slender, porrect, extending much beyond the head; 3rd joint lanceolate, nearly half the length of the 2nd. Fore wings acute, clouded towards the exterior border with pale brown, adorned with four oblique tawny lines; 1st line extending from near the base to the costa at half the length; 2nd, 3rd, and 4th converging slightly towards the costa, on approaching which they are retracted; 3rd and 4th mostly in the brownish part, where they are bordered with pale testaceous on the outer side; a submarginal pale testaceous festoon, bordered with dark brown on the outer side. Hind wings whitish. Length of the body 2¾ lines; of the wings 8 lines.

38. **Micra intricata.** *Fœm.* Albida, palpis porrectis caput sat superantibus articulo 3° lanceolatæ; alis anticis cervinis linea antemedia alba arcuata antice furcata plagamque fuscam includente, plaga fusca majore subapicali albo interlineata et marginata.

Female. Whitish, slender. Palpi porrect, smooth, slender, extending somewhat beyond the head; 3rd joint lanceolate, about half the length of the 2nd. Abdomen lanceolate, not extending beyond the hind wings. Fore wings fawn colour, acute, moderately broad; an antemedial curved white line, which is forked in front, and there includes a costal brown patch; a larger costal brown patch near the tip, interlined with white, and bordered by two white lines which are partly connected; exterior border slightly rounded, moderately oblique. Length of the body 3 lines; of the wings 8 lines.

39. **Eutelia quadrilitturata.** *Fœm.* Fusca, crassa; palpis validis erectis verticem sat superantibus, articulo 3° lineari 2° paullo breviore; thorace antice cinereo-biguttato; alis anticis strigis duabus albis, 1ª furcata maculaque exteriore cinerea connexis, lineis duabus exterioribus albis transversis angulosis nigro marginatis 2ª submarginali ex parte duplicata, lunulis marginalibus nigris albido marginatis; alis posticis macula apud angulum interiorem alba.

Female. Brown, very stout, cinereous-brown beneath. Palpi stout, erect, rising somewhat higher than the vertex; 3rd joint linear, rounded at the tip, a little shorter than the 2nd. Antennæ stout. Thorax with a cinereous dot on each side in front. Abdomen paler brown, extending rather beyond the hind wings. Legs stout; femora fringed; spurs whitish; tarsi with whitish bands. Fore wings rounded at the tips, with two white streaks; 1st streak forked, proceeding from a little before the middle of the costa to the disk, adjoining a cinereous spot on its outer side; 2nd proceeding obliquely from a little beyond the middle of the interior border to the disk; two exterior transverse zig-zag black-bordered white lines, the 1st incomplete, the 2nd submarginal, and partly double; marginal lunules black, whitish-bordered; fringe with whitish dots. Hind wings with a white spot near the interior angle, and with a cinereous marginal festoon. Wings beneath with some dark brown zig-zag transverse lines, which are most numerous on the hind wings. Length of the body 5 lines; of the wings 12 lines.

Gen. NEDROMA.

Mas. Corpus robustum. Caput fasciculo frontali munitum. Proboscis elongata. Palpi validi, breves, oblique ascendentes, verticem superantes; articulus 3^{us} gracilis, linearis, 2° breviore. Thorace antice carinatus. Abdomen alas posticas paullo superans; fasciculus apicalis subcompressus. Pedes fimbriati, sat robusti; calcaria longa, gracilia. Alæ anticæ latæ, vix acutæ, costa basi subrotundata, margine interiore excavato.

Male. Body stout. Head with a frontal tuft, which forms a ridge above, and extends somewhat beyond the face. Proboscis long. Palpi stout, smooth, obliquely ascending, rising higher than the vertex; 3rd joint linear, rounded at the tip, rather shorter and much more slender than the 2nd. Fore tegulæ of the thorax forming a ridge. Abdomen extending a little beyond the hind wings; apical tuft moderately large; slightly compressed. Legs rather stout; femora and fore tibiæ fringed; spurs long, slender. Wings broad. Fore wings hardly acute; costa slightly rounded near the base; exterior border rounded, not oblique; interior border excavated beyond the middle; 1st, 2nd, and 3rd inferior veins approximate at the base; 4th remote.

40. NEDROMA FERRUGINEA. *Mas.* Ferruginea, subtus ferrugineo cinerea; alis anticis transverse nigro-conspersis; alis posticis ferrugineo fuscis subtus transverse fuseo subconspersis.

Male. Ferruginous, ferruginous-cinereous beneath. Fore wings above transversely black-speckled. Hind wings ferruginous-brown; under side transversely and slightly brown speckled. Length of the body 7½ lines; of the wings 18 lines.

Gen. STRIDOVA.

Fœm. Corpus læve, robustum. Caput latiusculum. Proboscis brevis. Palpi oblique ascendentes, verticem superantes; articulus 2^{us} brevi fimbriatus; 3^{us} linearis, 2° paullo brevior. Antennæ glabræ, graciles. Thorax squamosus. Abdomen alas posticas vix superans. Pedes breves, robusti vix pilosi. Alæ anticæ breves, latæ, apice rectangulatæ, margine exteriore subconvexo vix obliquo.

Female. Body smooth, stout. Head rather broad. Proboscis short. Palpi obliquely ascending, rising higher than the vertex; 2nd joint with a short fringe; 3rd linear, a little shorter than the 2nd. Antennæ smooth, slender. Thorax squamous. Abdomen hardly extending beyond the hind wings. Legs short, stout, hardly pilose; hind tibiæ with four long spines, one in each pair longer than the other. Wings broad, short. Fore wings rectangular at the tips; exterior border slightly rounded, hardly oblique; 4th inferior vein, or median nervule, not very remote from the other three which are contiguous at the base.

The short wings and the structure of the veins chiefly distinguish this genus from the other *Hypogrammidæ*.

41. STRIDOVA ALBIGUTTA. *Fœm.* Murina, subtus argenteo cinerea; capite albo-fasciato; alis anticis atomis lineis duabus transversis undulatis indeterminatis macula discoidali punctis paucis costalibus punctisque marginalibus nigricante notatis albis; alis posticis subtus cinereis puncto discoidali atomisque fuscis.

Female. Mouse colour; under side silvery cinereous. Head with a white band between the eyes. Wings with a cinereous fringe, which is interlined with brown. Fore wings with a few white speckles; two indeterminate undulating transverse white lines; a few costal white points, and a row of marginal white blackish-marked points; a white discoidal spot. Hind wings beneath cinereous, thickly speckled with brown; a brown point in the disk. Length of the body 4 lines; of the wings 10 lines.

42. BRIARDA CONTURBATA. *Fœm.* Fusca; palpis oblique ascendentibus verticem sat superantibus articulo 3° lineari, 2° duplo breviore; abdomine nigrocante-bicristato, alas posticas paullo superante; alis anticis cinereo-fuscis, plaga magna postica antemedia pallide cinerea striga basali fascia informi lineis tribus exterioribus transversis angulosis cinereo marginatis striga transversa postmedia strigaque subapicali obscure fuscis; alis posticis fuscis, striga basali plagaque discoidali cinereis semihyalinis.

Female. Brown. Palpi rather slender, obliquely ascending, rising somewhat higher than the vertex; 3rd joint linear, rounded at the tip, about half the length of the 2nd. Pectus cinereous, thickly clothed with long hairs. Abdomen extending a little beyond the hind wings, with two blackish crests, one on the 1st segment, the other on the 3rd segment; under side pale pearly cinereous. Fore wings cinereous-brown, slightly rounded at the tips; a large pale cinereous antemedial patch near the interior border, contiguous to a dark brown streak, which proceeds from the base, and is bounded on the outer side by an irregular dark brown band, which is broadest towards the costa; three exterior transverse indistinct zig-zag dark brown cinereous-bordered lines; a broad transverse dark brown streak between the 2nd and 3rd lines, and a little longitudinal subcostal subapical dark brown streak; exterior border rounded, rather oblique. Hind wings brown, with a cinereous semi-hyaline streak proceeding from the base, and with a patch of the same hue in the disk. Length of the body 7 lines, of the wings 17 lines.

Gen. TOLNA.

Mas. Corpus robustum, squamosum. Caput magnum; frons lata. Palpi validi, fere erecti, verticem paullo superantes; articulus 2^{us} latus; 3^{us} lanceolatus, 2^{i} dimidio brevior. Antennæ subtilissime setulosæ. Abdomen alas posticas non superans; fasciculus apicalis longiusculus, subcompressus. Pedes validi, femoribus tibiisque dense pilosis. Alæ anticæ latæ, acutæ, margine exteriore vix convexo. Alæ posticæ margine exteriore subangulatæ valde rotundato.

Male. Body stout, squamous. Head large, front broad. Proboscis moderately long. Palpi stout, nearly erect, rising a little higher than the vertex; 2nd joint broad; 3rd lanceolate, less than half the length of the 2nd. Antennæ nearly imperceptibly setulose. Abdomen tapering from the base to the tip, not extending beyond the hind wings; apical tuft elongated, slightly compressed. Legs stout; femora and tibiæ densely clothed; spurs long, slender. Wings broad, not long. Fore wings acute; interior border hardly curved, moderately oblique; 4th inferior vein very remote from the other three. Hind wings, with the exterior border much rounded, indistinctly angular in the middle.

It may be distinguished from the genus *Tavia* by the much shorter third joint of the palpi.

43. TOLNA VERSICOLOR. *Mas.* Fusca; capite thoraceque cinereo conspersis; alis anticis viridi cæruleo purpureoque conspersis, lineis sex transversis angulosis non conspersis, fascia alba obliqua postmedia, reniformi angusta e atomis viridibus, plaga

costali subapicali magna ferruginea albo marginata, punctis marginalibus albis; alis posticis striga apicali alba.

Male. Brown. Head and thorax minutely speckled with cinereous. Palpi testaceous on the inner side. Abdomen pale cinereous beneath at the tip. Joints of the tarsi and spurs with pale cinereous tips. Fore wings flecked with green, with pale blue, and with pale purple scales; six zig-zag transverse lines of the ground hue, but without speckles, these lines are distinguished by the clustering speckles with which they are irregularly bordered; the 4th, 5th, and 6th lines are partly included in an oblique white band, which extends from beyond the middle of the costa to the hinder part of the exterior border; reniform mark narrow, formed by green speckles; a large ferruginous costal patch between the band and the tip, bordered with white on the hind side, and including three white costal points; marginal festoon black, including white points, bordered with testaceous on the outer side; fringe with elongated cinereous dots; under side with a white band, with exterior pale testaceous costal points, and with black white-marked points along the exterior border. Hind wings with a white apical streak, and with a black line along the exterior border; this line is bordered with pale testaceous on the outer side, and includes four white points; under side thinly speckled with white, with marginal points like those of the fore wings, with a transverse streak in the disk, and with two exterior bands, which are unspeckled, and a little darker than the ground hue. Length of the body 12 lines; of the fore wings 30 lines. See Plate VII, Fig. 10.

44. OPHIDERES DIVITIOSA. *Fœm.* Ferruginea subtus fusca; abdomine ochraceo fusco-vittato; alis anticis purpureo suffusis, fasciis duabus antemediis lineis que duabus obliquis, linea exteriore perobliqua subundulata, strigis duabus transversis adhuc exterioribus lineaque intermedia transversa fuscis, plaga basali fasciaque postmedia viridibus, reniformi sordide viridi fusco marginata; alis posticis luteis, basi fuscis, margine lato purpureo fusco, maculis marginalibus albidis.

Female. Ferruginous, brown beneath. Abdomen ochraceous, with a brown stripe which occupies the whole of the tip, and is attenuated and abbreviated towards the base above, but is broad and entire beneath. Fore wings acute, purple-tinged, with two oblique antemedial brown bands, and with two oblique brown lines; 1st line between the base and the 1st band; 2nd between the bands; an exterior very oblique slightly undulating brown line, which approaches the costa at four-fifths of its length, and is very near the 2nd band on the interior border, and is irregularly bordered by a grass-green band on the outer side; a slight grass-green patch near the base; reniform mark dark dull green, brown bordered, transverse, irregularly oval; an exterior transverse brown streak, and a more exterior angular brown line, which borders the fore part of the outer side of the green band; a submarginal transverse brown streak; underside with an irregular transverse luteous streak in the disk. Hind wings luteous, brown at the base, with a broad purplish brown border, and with whitish marginal spots. Length of the body 13½ lines, of the wings 41 lines. See Plate VII, Fig. 11.

45. ACHÆA OPHISMOIDES. *Fœm.* Ferruginea; palpis erectis verticem sat superantibus, articulo 3° lineari 2° triplo breviore; alis anticis fascia media glauco-alba nigro marginata antice dilatata extus angulosa, striga apicali obliqua nigricante, punctis submarginalibus nigris; alis posticis fuscis, fascia nigricante postmedia diffusa latissima, maculis duabus magnis albis 1ᵃ apicali 2ᵃ marginali.

Female. Ferruginous. Body cinereous beneath. Palpi erect, rising somewhat higher than the vertex; 3rd joint linear, much more slender than the 2nd, and about one-third of its length. Abdomen not extending beyond the hind wings; apical tuft slightly compressed. Tarsi spinulose. Fore wings broad, slightly rounded at the tips, with a broad glaucous white middle band, which is narrowly black bordered on each side, and is dilated towards the costa, and is oblique and zig-zag on its outer side, and contains three black points, one indicating the orbicular mark, and two the reniform; a blackish streak extending obliquely from the tip to the disk; a row of submarginal black points; fringe blackish, bordered with cinereous; under side with a white band, which is not dilated in front, and does not extend to the costa. Hind wings brown, with a diffuse postmedial very broad blackish band; two large white spots, the 1st apical, the 2nd on the exterior border, and near the 1st; under side pale cinereous brown, with an antemedial brown lunule, and two exterior transverse brown lines. Length of the body 11 lines; of the wings 28 lines.

46. ACHÆA PARTITA. *Fœm.* Fusca; palpis fere erectis verticem superantibus, articulo 3° sublanceolato 2^{i} dimidio breviore; alis anticis nigrofuscis fascia media lata cervina fusco nebulosa nigro bipunctata antice dilatata, linea exteriore nigra angulosa, linea adhuc exteriore nigricante obliqua vix undulata cervino submarginata, fascia postmedia strigaque exteriore subtus albis; alis posticis plagis duabus marginalibus lituris que nonnullis apud angulum interiorem albis.

Female. Brown. Body cinereous beneath. Head and thorax rather darker than the abdomen. Palpi smooth, nearly erect, rising higher than the vertex; 3rd joint nearly lanceolate, more slender than the 2nd, and about one-third of its length. Fore wings blackish brown, with a broad fawn-coloured middle band, which is much dilated in front, is concise and hardly oblique on the inner side, and is mostly limited on the outer side by a zig-zag black line; it is partly and slightly clouded with brown, and includes two black points, which represent the reniform mark; an oblique hardly undulating blackish line beyond the zig-zag line, partly bordered with fawn colour on its outer side; submarginal points black; under side with a white postmedial band, and with a white streak along the fore part of the exterior border. Hind wings with two white patches, one at the tip of the costa, the other on the fore part of the exterior border; some small white marks near the interior angle; under side whitish from the base to beyond the middle, including two brown bands; an exterior slender dentate white band. Length of the body 9 lines; of the wings 22 lines. See Plate VI, Fig. 8.

47. HYPÆTRA ATRIPLAGA. *Mas.* Ferruginea; capitis vertice thoraceque antico atris; palpis oblique ascendentibus verticem non superantibus, articulo 2° nigricante notato, 3° lineari brevi; alis anticis nigro conspersis, plagis duabus magnis guttaque intermedia atris cinereo marginatis, plaga 1^{a} basali postice attenuata lineam subarcuatam emittente, 2^{a} discoidali lineam arcuatam lineamque rectam emittente, linea exteriore cinerea transversa brevi undulata nigricante-marginata, puncto basili punctisque marginalibus nigris; alis posticis nigricantibus, basi cinereis, fimbria pallide testacea.

Male. Ferruginous, cinereous beneath. Vertex of the head and forepart of the thorax deep black. Palpi stout, obliquely ascending, not rising higher than the vertex; 2nd joint blackish in the middle on the outer side; 3rd, linear, rounded at the tip, not more than one-fourth of the length of the 2nd. Antennæ slender, minutely setose. Abdomen not extending beyond the hind wings; apical tuft very small. Legs blackish, stout; tibiæ slightly fringed; tarsi with cinereous bands. Fore wings moderately broad, minutely black speckled, rounded at the tips; two large patches and an intermediate dot, deep black, cinereous-bordered; 1st patch near the base, attenuated hindward, and extending to the interior border, and emitting a slightly curved line to the costa; 2nd patch in the disk, in a longitudinal line with the dot, emitting a curved line to the interior border, and a straight line to the hind end of an exterior short transverse undulating cinereous blackish-bordered line; a basal point and marginal points black; a blackish line along the exterior part of the costa, including three testaceous points. Hind wings blackish, cinereous towards the base; fringe pale testaceous. Wings beneath with a blackish discoidal spot (which is lunate in the fore wings), with an exterior incomplete undulating blackish line, and with a very broad marginal blackish band. Length of the body 6½ lines; of the wings 18 lines.

48. HYPÆTRA BIANGULATA. *Mas.* Cervina, capite postice nigricante; palpis oblique ascendentibus verticem non superantibus, articulo 3° conico; thorax antico nigricante; alis anticis subfalcatis, fascia obliqua nigricante postice biangulata et pallide marginatâ, sputio exteriore fusco-nebuloso, striga costali antemedia fusca brevissima; alis posticis pallide fuscis apud costam cinereis.

Male. Fawn colour, paler beneath. Head blackish along the hind border. Palpi stout, obliquely rounding, not rising higher than the vertex; 3rd joint conical, not more than one-eighth of the length of the 2nd. Antennæ minutely serrated. Fore tegulæ of the thorax blackish. Abdomen a little shorter than the interior border of the hind wings; apical tuft very small. Fore wings broad acute, subfalcate, with a blackish straight band, which extends from near the base of the interior border to near the tips of the costa, and forms on its hind side two large angles, which have pale borders, the space beyond being mostly clouded with brown; marginal festoon blackish, very slender; a dark brown oblique very short costal antemedial streak. Hind wings pale brown, cinereous along the costa. Length of the body 7 lines; of the wings 20 lines.

49. HYPÆTRA (?) NANA. *Fœm.* Ferruginea; palpis cinereis oblique ascendentibus verticem paullo superantibus, articulo 2° extus fusco, 3° lanceolate; alis anticis lineis duabis transversis fuscis 1ª abbreviata obliqua 2ª valde arenata, linea submarginali fuscescente ungulosa vix conspicua, striga antica transversa lata utra, reniformi fusco marginata; alis posticis fuscis.

Female. Ferruginous, cinereous beneath. Palpi cinereous, rather slender, obliquely ascending, rising a little higher than the vertex; 2nd joint mostly dark brown on the outer side; 3rd, lanceolate, much shorter than the 2nd. Abdomen extending a little beyond the hind wings. Legs smooth, moderately stout. Fore wings with two transverse brown lines; 1st line antemedial, oblique, extending from the disk to the interior border; 2nd, postmedial, much curved outward; a brownish, zig-zag, very indistinct submarginal line; a broad, deep black streak extending from the costa to the disk, notched on the outer side, hiding part of the reniform mark; the latter large, brown bordered, of the usual form; underside without markings. Hind wings brown. Length of the body 4½ lines; of the wings 11 lines.

50. ATHYRMA ALBICINCTA. *Fœm.* Ferruginea; capite fascia guttisque duabus anterioribus albis; palpis fere erectis, verticem multo superantibus articulo 3° lineari longo; thorace albo bifasciato; abdomine fuscescente cinereo, macula basali ferruginea; alis anticis purpurascente ferrugineis, plaga postica maxima nigricante albo-marginata, lineis duabus anticis transversis fuscis angulosis; alis posticis fuscis antice cinereis.

Female. Ferruginous, smooth, testaceous-cinereous beneath. Head with a slender white band on the vertex, and with a white dot on each side of the front. Palpi nearly erect, rising very much higher than the vertex; 3rd joint linear, slightly acute, rather shorter than the 2nd. Thorax with two slender white bands bordering the tegulæ. Abdomen brownish cinereous, not extending beyond the hind wings, with a ferruginous spot at the base. Fore wings purplish ferruginous, acute; a very large blackish patch resting on the interior border and bordered with white in front; two brown zig-zag lines extending from the costa to the patch; fringe cinereous, interlined with blackish. Hind wings brown, cinereous in front. Length of the body 6½ lines; of the wings 17 lines.

51. OPHIUSA SUBÆNESCENS. *Mas.* Cinereo fusca; palpis fere erectis verticem paullo superantibus, articulo 3° longi conico; alis anticis nigro conspersis, fasciis duabus atris fusco extus late marginatis, 1ª apud marginem interiorem producta, 2ª antice dilatata flexa et fere interrupta, fascia marginali abbreviata obscure fusca, lineis quatuor fuscis transversis undulatis, reniformi fusco aut nigro marginata; alis posticis lineis tribus fuscis transversis subangulosis.

Male. Cinereous brown, rather slender, cinereous beneath. Palpi stout, nearly erect, rising a little higher than the vertex; 3rd joint elongate, conical, not more than one-fourth of the length of the 2nd. Antennæ slender, minutely setulose. Abdomen hardly extending beyond the hind wings; apical tuft very small. Legs slender; femora and tibiæ fringed. Fore wings acute, minutely black-speckled, with two deep black bands; a brown space along the outer side of each band; 1st band prolonged outward along the interior border; 2nd widened in front, where it is bent outward, and nearly interrupted; a dark brown marginal band, which is abbreviated at each end; two transverse undulating brown lines near the base, and two more between the bands, the latter lines between the interior border and the reniform mark, which is bordered with brown or with black; under side with a broad abbreviated dark brown submarginal band. Hind wings with three brown transverse postmedial slightly zig-zag lines. Length of the body 9 lines; of the wings 22 lines. See Plate VI, Fig. 9.

52. GRAMMODES CURVILINEA. *Fœm.* Fusca; corpore alisque subtus facieque albidis; palpis oblique ascendentibus subtus fimbriatis; alis fascia antemedia alba recta; alis anticis fascia postmedia tenui alba angulata biarcuata extus corvino marginata, fasciis subtus duabus fuscis 1ª furcata; alis posticis maculo submarginali alba, fasciis subtus tribus fuscis 3ª latissima maculas albas includente.

Female. Brown. Face, palpi beneath and body beneath whitish.

Palpi obliquely ascending, fringed beneath; 3rd joint linear, about half the length of the 2nd. Abdomen cinereous brown. Legs mostly white. Wings with a white straight antemedial band. Fore wings with a postmedial slender white band, which has two curves, and is bordered with fawn colour on the outer side, and forms an acute inward angle in the middle; under side whitish, with two brown bands; 1st band in the middle, forked in front, much broader than the 2nd, which is nearer the exterior border, and is dilated near the costa. Hind wings with a white spot near the exterior border; under side white, with three brown bands; 1st and 2nd bands slender, dentate; 3rd very broad, including some white spots. Length of the body 6 lines; of the fore wings 16 lines.

Gen. OBBA.

Mas. Corpus robustum. Caput planum; fasciculus frontalis brevis. Proboscis mediocris. Palpi validi, fere erecti, verticem sat superantes; articulus 3^{us} lanceolatus, 2° duplo brevior. Antennæ setosæ. Abdomen alas posticas non superans; fasciculus apicalis mediocris, subcompressus. Pedes sat graciles, late fimbriati; calcaria longa, gracilia. Alæ anticæ latæ, subacutæ, basi lanuginosæ, costæ dimidio basali late fimbriato, margine exteriore rotundato.

Male. Body stout. Head flat above, with a short frontal tuft. Proboscis moderately long. Palpi stout, nearly erect, rising somewhat higher than the vertex; 3rd joint lanceolate, about half the length of the 2nd. Antennæ setose; the bristles slightly decreasing in length from the base to the tips. Abdomen tapering, not extending beyond the hind wings; apical tuft moderately long, slightly compressed. Legs rather slender; femora and tibiæ broadly fringed; spurs long, slender. Wings broad. Fore wings slightly acute; woolly at the base; costa straight, with a broad flat smooth softened fringe along half the length from the base; exterior border rounded, moderately oblique.

53. OBBA PROMPTA. *Mas.* Fulva; alis nigro conspersis, linea obliqua nigra recta, linea exteriore nigricante angulosa, punctis submarginalibus nigris; alis anticis linea 1^{a} rufescente marginata.

Male. Tawny, a little paler beneath. Wings thinly and minutely black speckled, with a straight black line, which extends from the tips of the fore wings to a little beyond the middle of the interior border of the hind wings, and is reddish-bordered on the outer side in the fore wings; an exterior zig-zag blackish line, and a row of submarginal black points; fringe blackish beneath. Length of the body 5½ lines; of the wings 21 lines.

Gen. ZIRONA.

Fœm. Corpus vix robustum. Proboscis breviuscula. Palpi porrecti, squamosi, sat graciles; vix ascendentes, caput longe superantes; articulus 3^{us} lanceolatus, 2° brevior. Antennæ graciles, glabræ. Abdomen breviusculum. Pedes graciles, læves; calcaria longa, gracilia. Alæ anticæ latæ, acutæ, margine exteriore rotundato subobliquo.

Female. Body hardly stout. Proboscis rather short. Palpi porrect, squamous, hardly ascending, rather slender, extending much beyond the head; 3rd joint lanceolate, much more than half the length of the 2nd. Antennæ slender, smooth. Abdomen rather shorter than the interior border of the hind wings. Legs slender, smooth; spurs long, slender. Wings broad. Fore wings acute; exterior border rounded, slightly oblique; 1st, 2nd, and 3rd inferior veins approximate at the base; 4th moderately remote.

The structure of the palpi distinguishes this genus from the other *Poaphilidæ*.

54. ZIRONA MARGINATA. *Fœm.* Cinereo fusca; alis fascia marginali pallidiore cinereo undulatim marginata, linea media transversa indistincta undulata obscure fusca; alis anticis linea antemedia fusca undulata valde indistincta, gutta discoidali cinerea.

Female. Cinereous brown. Wings with a paler marginal band, which is divided from the darker hue by a cinereous undulating line; a dark brown indistinct undulating middle line; fringe brown, cinereous at the base; under side without markings. Fore wings with a line like the one before mentioned, but more indistinct, and nearer the base; a cinereous dot in the disk between the lines. Length of the body 6 lines; of the wings 18 lines.

55. AMPHIGONIA FUMOSA. *Mas.* Ferrugineo cinerea; fasciculo frontali porrecto, palpis oblique ascendentibus articulo 2° late fimbriatis; antennis setosis; abdomine alas posticas vix superante fasciculo apicali parvo; pedibus fimbriatis; alis obscure cinereis,

fasciis tribus diffusis ferrugineis, lineis duabis transversis angulosis obscure fuscis; alis anticis lunula interrupta punctoque costali albis, margine exteriore subangulato; alis posticis margine exteriore subangulato.

Male. Ferruginous cinereous, paler beneath. Frontal tuft porrect, acute. Palpi obliquely ascending; 2nd joint thickly fringed in front. Antennæ minutely setose. Abdomen hardly extending beyond the hind wings; apical tuft small. Legs slender; femora and tibiæ fringed; tarsi with white dots above. Wings elongate, dark cinereous, with three diffuse ferruginous bands, and with two zig-zag dark brown lines; 1st line between the 1st and 2nd bands; 2nd, between the 2nd and 3rd bands; markings less distinct beneath. Fore wings acute, with an interrupted white lunule in the 2nd band, and with an elongated white costal point in front of the 3rd band; exterior border slightly angular. Hind wings with the exterior border more angular. Length of the body 7 lines; of the wings 19 lines.

56. THERMESIA (?) SEJUNCTA. *Fœm.* Fusca, robusta; vertice, thoracis margine antico plagisque duabus rufis; palpis oblique ascendentibus verticem longe superantibus, articulo 2° fimbriato, 3° subclavato apice albido; alis latis, fasciis tribus flavis rufo conspersis valde indeterminatis et interruptis, linea submarginali undulata nigricante, puncto discoidali punctisque marginalibus nigris; alis anticis acutis, margine exteriore convexo subobliquo.

Female. Brown, stout, cinereous-testaceous beneath. Vertex of the head, fore border of the thorax, and a patch on each of the hind tegulæ bright red. Palpi obliquely ascending, rising much higher than the vertex; 2nd joint fringed above; 3rd subclavate, whitish at the tip, much more slender than the 2nd, and a little more than half its length. Abdomen brownish-cinereous, not extending beyond the hind wings. Legs smooth, rather slender. Wings broad, with three very irregular and much interrupted yellow bands, which are speckled with bright red; an undulating irregular blackish line near the exterior border; a discoidal point, and marginal points and marginal festoon blackish; under side without markings. Fore wings acute; bands brighter and more distinct than those of the hind wings; exterior border rounded, slightly oblique. Length of the body 7½ lines; of the wings 20 lines.

57. CAPNODES (?) TRINOTATA. *Fœm.* Ferrugineo rufa, robusta; abdomine cinereo-rufo; pedibus fimbriatis; alis latis, nigro subconspersis, linea postmedia transversa e punctis albis, punctis marginalibus nigris; alis anticis acutis, strigis tribus costalibus niveis, margine exteriore subconvexo subobliquo.

Female. Ferruginous red, stout, paler and with a cinereous tinge beneath. Antennæ slender. Abdomen cinereous red, shorter than the interior border of the hind wings. Legs stout; femora and tibiæ fringed; spurs slender, very long. Wings broad, thinly and minutely black-speckled, with a postmedial transverse line of white points, and with marginal black points. Fore wings acute, with three pure white irregular streaks extending from the costa to the disk; 1st streak near the base; 3rd on the inner side of the row of white points; four exterior whitish elongated costal points; exterior border slightly rounded and oblique. Length of the body 7½ lines; of the wings 20 lines.

The palpi are destroyed in the specimen described. It may be distinguished from *C. sexmaculata* by having no transverse blackish lines on the fore wings.

Gen. RICLA.

Fœm. Corpus sat robustum. Caput fasciculo frontali longo peracuto. Palpi graciles, læves, oblique ascendentes, verticem valde superantes; articulus 3^{us} linearis, apicem versus subdilatatus, 2° multo brevior. Abdomen alas posticas non superans. Pedes graciles fimbriati; calcaria longa, gracilia. Alæ anticæ longæ, apice rectangulatæ, costa vix convexa, margine exteriore angulato.

Female. Body moderately stout. Frontal tuft elongate, very acute. Palpi slender, smooth, obliquely ascending, rising very much higher than the vertex; 3rd joint much shorter than the 2nd, linear, slightly dilated towards the tip, which is truncated. Abdomen not extending beyond the hind wings. Legs slender; femora and tibiæ fringed; spurs long, slender. Wings elongate. Fore wings rectangular at the tips; costa hardly rounded; exterior border forming an obtuse angle in the middle; 2nd inferior vein as near to the 3rd as to the 1st; 4th very remote.

58. RICLA EXPANDENS. *Fœm.* Ferruginea, fasciculo frontali albo-marginato, palporum articulo 3° cano nigro-consperso; alis anticis linea media transversa alba arcuata nigro marginata, fascia

exteriore indeterminata albido flava, spatio adhuc exteriore pallide purpurascente ferrugineo guttas quatuor fuscas cinereo marginatas includente, linea postica cinerea arcuata fusco marginata apud marginem exteriorem dilatata, linea basali fusca angulosa, gutta discoidali nigra; alis posticis cinereo fuscis.

Female. Ferruginous, cinereous beneath. Frontal tuft bordered with white. Third joint of the palpi hoary, black-speckled, wholly black towards the tip, which is hoary. Abdomen cinereous. Fore wings with a white transverse middle inward-curved line, which is black-bordered on its inner side, and is accompanied on the outer side by a whitish-yellow incomplete irregular band; exterior space pale purplish ferruginous, with four brown partly cinereous-bordered dots, which form a transverse undulating line in front of a cinereous curved line; the latter is brown-bordered on both sides, and extends from the apical part of the interior border towards the hind part of the exterior border, where it terminates in a brown patch; a zig-zag transverse brown line near the base, and an antemedial black dot in the disk. Hind wings cinereous brown; fringe cinereous. Length of the body 6½ lines; of the wings 18 lines.

Gen. RACLIA.

Fœm. Corpus lœve, sat validum. Caput fasciculo frontali porrecto longissimo acuto. Proboscis breviuscula. Palpi graciles, lœves, oblique ascendentes, verticem longe superantes; articulus 3^{us} linearis, 2° paullo longior. Antennæ sat robustæ. Abdomen alas posticas sat superanos. Pedes læves, graciles, tibiis anticis fasciculatis, calcaribus longissimis gracillimis. Alæ anticæ acutæ, vix falcatæ, costa perparum convexa margine exteriore postico rotundato obliquo.

Female. Body smooth, moderately stout. Frontal tuft porrect, acute, extending much beyond the head. Proboscis rather short. Palpi slender, smooth, obliquely ascending, rising much higher than the vertex; 3rd joint linear, rounded at the tip, a little longer than the 2nd. Antennæ rather stout. Abdomen extending somewhat beyond the hind wings. Legs smooth, slender; fore legs short, their tibiæ tufted; spurs very long and slender. Wings moderately broad. Fore wings acute, hardly falcate; costa very slightly rounded; hind part of the exterior border rounded and oblique; 2nd inferior vein much nearer to the 3rd than to the 1st; 4th remote.

59. RACLIA CERVINA. *Fœm.* Pallide cervina, subtus pallide testacea; alis anticis fusco pallido transverse strigatis, lineis tribus transversis pallide cinereis fusco pallido marginatis, 1^{a} et 2^{a} antice approximatis, 2^{a} et 3^{a} subangulosis, puncto discoidali guttis duabus submarginalibus punctisque marginalibus fuscis; alis posticis fuscis, apud costam albidis.

Female. Pale fawn colour, pale testaceous beneath. Fore wings transversely and indistinctly streaked with pale brown; three transverse pale cinereous lines, which are slightly bordered with pale brown; 1st and 2nd converging much from the interior border to the costa; 2nd and 3rd slightly zig-zag; 3rd diverging hindward from the 2nd; a brown point in the disk between the 1st and 2nd lines; two small brown dots beyond the 3rd line and brown marginal points; under side reddish fawn colour in the disk, speckled with brown along the costa, whitish along the interior border. Hind wings above brown, whitish along the costa. Length of the body 6 lines; of the wings 15 lines.

Gen. ORIXA.

Mas. Corpus gracile. Caput fasciculo frontali brevi. Palpi graciles, arcuati, utrinque fimbriati, verticem valde superantes; articulus 3^{us} acutus, 2° paullo brevior. Antennæ graciles, setulosæ. Abdomen alas posticas paullo superans; fasciculus apicalis parvus. Pedes graciles, breves; tibiæ posticæ fimbriatæ; calcaria longa, gracilia. Alæ anticæ latæ, apice subrectangulatæ, costa perparum convexa, margine exteriore rotundato vix obliquo.

Male. Body slender. Frontal tuft short. Palpi slender, curved, fringed on both sides, longer than the breadth of the head, rising very much higher than the vertex; 3rd joint acute, a little shorter than the 2nd. Antennæ slender, minutely setulose. Abdomen extending a little beyond the hind wings; apical tuft small. Legs slender, smooth; hind tibiæ with a short thick fringe; spurs long, slender. Wings broad. Fore wings hardly acute, nearly rectangular at the tips; costa very slightly rounded; exterior border rounded, hardly oblique; veins with the usual structure.

60. ORIXA FILIFERA. *Mas.* Saturate ferrugineo fusca; capite fascia alba angulata; alis anticis lineis duabis transversis puncto que discoidali intermedio chalybæis nigro marginatis.

Male. Dark ferruginous brown. Head with a white angular band on the front. Pectus cinereous. Abdomen dark brown; under side whitish, except at the tip. Legs beneath and tarsi wholly pale cinereous. Fore wings with two transverse slightly black-bordered chalybeous blue lines, and with an intermediate discoidal point of the same hue; 1st line near the base, more oblique than the 2nd. Hind wings dark brown. Length of the body 7 lines; of the wings 17 lines.

61. PYRALIS (?) CRASSALIS. *Fœm.* Argenteo cinerea, robusta; capite subtus pectore pedibusque argenteo albis; fasciculo frontali acuto; palpis porrectis late fimbriatis caput sat superantibus, articulo 3° minimo; abdomine alas posticas paullo superante; alis atomis nonnullis fasciisque duabus undulatis indeterminatis nigricantibus, punctis marginalibus nigris; alis anticis fascia 1ª apud costam attenuata 2ª flavescente marginata; alis posticis fascia 2ª flavescente intus late marginata.

Female. Silvery cinereous, stout. Head beneath, pectus and legs silvery white. Head rather large; frontal tuft acute. Palpi porrect, broadly fringed beneath, extending somewhat beyond the head; 3rd joint very minute. Antennæ smooth, slender. Abdomen extending a little beyond the hind wings. Legs smooth, slender; hind tibiæ with four long slender spurs. Wings with some blackish speckles, and with two irregular undulating blackish bands; marginal points black; under side with a black discoidal dot, and with two incomplete blackish bands. Fore wings acute; 1st band attenuated towards the costa; 2nd bordered on the inner side by a yellowish line; exterior border rounded, slightly oblique. Hind wings with the 2nd band bordered on the inner side by a yellowish band, which is dilated in the middle. Length of the body 4½ lines; of the fore wings 10½ lines.

62. SAMEA FIGURALIS. *Fœm.* Cervina, subtus alba; abdomine fusco segmentis albo marginatis; alis fasciis duabus obliquis albis diaphanis nigro marginatis; alis anticis fascia 2ª fur cata lineam nigram undulatum includente.

Female. Fawn colour, white beneath. Abdomen brown; hind borders of the segments white. Legs white, long, smooth, slender. Wings with two pellucid iridescent oblique white black-bordered bands, which are irregular in the fore wings; 1st band antemedial, extending to the base in the hind wings; 2d, postmedial, forked in the fore wings, including a black undulating line; marginal festoon black; fringe white; under side with the pellucid bands broadly and irregularly blackish-bordered. Length of the body 3½ lines; of the fore wings 10 lines.

Gen. VATICA.

Fœm. Corpus gracile. Oculi magni, prominuli. Proboscis valida; palpi ascendentes; articulus 2^{us} late fimbriatus; 3^{us} brevissimus. Thoracis tegulæ nosticæ longæ. Abdomen alas posticas longe superans. Pedes læves, graciles; femora postica fimbriata; tibiæ posticæ brevissimæ. Alæ anticæ amplæ, subacutæ, margine exteriore convexo. Alæ posticæ fasciculo longo apud marginem interiorem.

Female. Body slender. Eyes large, prominent. Proboscis stout. Palpi ascending, applied to the head; 2nd joint broadly fringed; 3rd very short. Hind tegulæ of the thorax long. Abdomen extending much beyond the hind wings. Legs smooth, slender; hind femora fringed; fore tibiæ very short; hind tibiæ with one spur in each pair extremely long. Wings ample. Fore wings slightly acute; exterior border rounded, moderately oblique. Hind wings with an elongate tuft in the disk near the interior border, which is broadly fringed.

The tuft on the hind wings distinguishes this genus from *Botys*, to which it is closely allied.

63. VATICA RUTILALIS. *Fœm.* Ochracea; corpore subtus pedibusque argenteo albis; femoribus anticis extus nigricantibus, tibiis anticis apice nigris; alis anticis vittis diffusis spatioque exteriore rufis, linea transversa postmedia arcuata costa fimbriaque nigris; alis posticis nigro late marginatis.

Female. Ochraceous. Body beneath and legs silvery white. Proboscis testaceous. Fore femora blackish on the inner side; fore tibiæ with black tips. Fore wings with diffuse red stripes, which extend to a black curved transverse postmedial line, beyond which the wings are red; costa and fringe black; under side with the apical part corresponding to the red part above blackish. Hind wings with a broad black border. Length of the body 6 lines; of the fore wings 14 lines.

64. **Botys interfixalis.** *Fœm.* Pallide flava, subtus albida, abdomine alas posticas longe superante, alis lineis duabus fuscis transversis obliquis, fascia marginali lata pallide æenea; alis anticis punctis costalibus nigricantibus, linea 1^a apud costam retracta, 2^a interrupta et abbreviata, linea exteriore fusca fasciam marginalim attingente.

Female. Pale yellow, slender, iridescent, whitish beneath. Abdomen extending much beyond the hind wings. Wings with two transverse oblique brown lines, and with a broad pale æneous marginal band. Fore wings acute, with several blackish costal points; 1st line retracted near the costa; 2nd interrupted in the disk, abbreviated near the costa; a 3rd exterior brown line, which joins the hind part of the marginal band. Length of the body 3 lines; of the wings 7 lines.

Nearly allied to *R. villinsalis* and to *R. Neoclisalis.*

Gen. Xacca.

Fœm. Corpus robustum, breve, squamosum. Caput inter antennas cornubus duobus porrectis lanceolatis. Proboscis mediocris. Palpi graciles, læves, oblique ascendentes, verticem sat superantes; articulus 3^{us} linearis, 2^i dimidio brevior. Antennæ validæ, breviusculæ. Abdomen lanceolatum, alas posticas longe superans; latera fasciculata. Pedes sat validi; coxæ anticæ longæ, clavatæ, apice fasciculatæ; calcaria longa, gracilia. Alæ anticæ acutæ, margine exteriore subconvexo.

Female. Body stout, smooth, squamous. Head in front with two porrect lanceolate appendages between the antennæ. Proboscis moderately long. Palpi slender, smooth, obliquely ascending, rising somewhat higher than the vertex; 3rd joint linear, rounded at the tip, less than half the length of the 2nd. Antennæ stout, rather short. Abdomen lanceolate, with small tufts along each side, extending much beyond the hind wings. Legs rather stout; fore coxæ long, clavate, densely tufted towards the tips; spurs long, slender. Wings moderately broad. Fore wings acute; exterior border slightly rounded, moderately oblique; 2nd inferior vein more than twice further from the 3rd than from the 1st; 4th emitted near the base of the wing.

65. **Xacca trigonalis.** *Fœm.* Cupreo purpureo, capite palpis thoraceque antico ochraceis; coxis anticis luteis purpureo fasci-

culatis, tibiis quatuor posterioribus luteis purpureo bifasciatis; alis anticis striga basali maculaque magna trigona costali ochraceis.

Female. Cupreous purple. Head, palpi, and fore part of the thorax ochraceous. Proboscis tawny. Pectus pearly white. Abdomen beneath pale testaceous, except towards the tip. Fore coxæ luteous, with purple tufts; four posterior tibiæ luteous, purple at the base and at the tips; tarsi luteous. Fore wings with a transverse ochraceous streak at the base, and with a large ochraceous costal triangular spot at a little before half the length. Length of the body 5½ lines; of the wings 11 lines.

Gen. OPULA.

Fœm. Corpus crassum. Proboscis brevis. Palpi graciles, arcuati, oblique ascendentes, verticem non superantes; articulus 3^{us} linearis, vix acutus, 2° duplo brevior. Antennæ robustæ, glabræ. Abdomen alas posticas sat superans. Pedes validi, læves; calcaria longa, gracilia. Alæ anticæ longissimæ, acutæ, margine exteriore convexo perobliquo.

Female. Body thick. Proboscis short. Palpi slender, curved, obliquely ascending, not rising higher than the vertex; 3rd joint linear, hardly acute, about half the length of the 2nd. Antennæ stout, smooth. Abdomen extending somewhat beyond the hind wings. Legs stout, smooth; spurs long, slender. Wings very long, moderately broad. Fore wings acute; exterior border rounded, very oblique; 4th inferior vein very remote from the 3rd.

66. OPULA IMPLETALIS. *Fœm.* Cervina, alis fasciis quatuor obliquis macularibus indeterminatis pallide flavescentibus cervino sublineatis.

Female. Fawn-colour. Wings with four oblique macular and very irregular pale yellowish bands, which are slightly and irregularly interlined with the ground hue; under side like the upper surface. Length of the body 7 lines; of the wings 18 lines.

67. GEOMETRA CONGRUA. *Mas.* Viridis; capite palpis antennis pectore abdomine pedibusque albis; palpis porrectis caput sat superantibus, articulo 2° parvo acuto; antennis sat late pectinatis; alis latis albo conspersis, puncto discoidali nigro, fimbria pallidis-

sime viridi; alis anticis subacutis margine exteriore fere recto; alis posticis margine exteriore subangulato.

Male. Grass green. Head, palpi, antennæ, pectus, abdomen, and legs white. Palpi smooth, slender, porrect, extending rather beyond the head; 3rd joint acute, less than one-fourth of the length of the 2nd. Antennæ rather broadly pectinated. Abdomen much shorter than the interior border of the hind wings. Legs smooth, slender; hind tibiæ with four rather short spurs. Wings broad, with a black point in the disk, with many shining white speckles, and with a very pale green fringe. Fore wings slightly acute; exterior border almost straight. Hind wings with the exterior border slightly angular in the middle. Length of the body 5 lines; of the fore wings 15 lines.

Gen. TRAINA.

Fœm. Corpus gracile. Proboscis longiuscula, sat valida. Palpi porrecti, graciles, subtus fimbriati, caput paullo superantes; articulo 3^{us} conicus. Antennæ gracillimæ, subsetulosæ. Abdomen breviusculum. Pedes longi, gracillimi; calcaria longa, gracilia; tibiæ anticæ incisæ, calcaribus apicalibus fimbriatis. Alæ latissimæ; anticæ acutæ, margine exteriore subconvexo; posticæ costa apice truncata, margine exteriore vix inciso.

Female. Body slender. Proboscis rather long and stout. Palpi porrect, slender, fringed beneath, extending a little beyond the head; 3rd joint conical, less than one-fourth of the length of the 2nd. Antennæ very slender, very minutely setose. Abdomen much shorter than the interior border of the hind wings. Legs long, very slender; fore tibiæ notched beneath at somewhat beyond the middle, with fringed apical spurs; hind tibiæ with four slender spurs. Wings very broad. Fore wings acute; exterior border slightly rounded, moderately oblique. Hind wings with the apical part of the costa obliquely truncated; exterior border very slightly festooned.

68. TRAINA STRAMINEATA. *Fœm.* Pallidissime straminea; capite ferrugineo-bifasciato; thorace antice ferrugineo; alis anticis ferrugineo conspersis, linea recta obliqua linea exteriore angulosa lineaque marginali ferrugineis; alis anticis costa lineaque 4^{a} transversa ferrugineis, gutta subcostali producta nigra; alis posticis puncto discoidali nigro.

Female. Very pale straw colour. Head with two ferruginous bands. Thorax ferruginous in front. Wings minutely speckled with ferruginous; a straight ferruginous line extending from a little beyond three-fourths of the length of the costa of the fore wings to a little beyond three-fourths of the length of the interior border of the hind wings; an exterior zig-zag ferruginous line, and a marginal ferruginous line. Fore wings with a ferruginous costa, and with a ferruginous transverse line near the inner side of a transversely elongated black discoidal dot. Hind wings with a black point on the disk. Length of the body 8 lines; of the wings 24 lines. See Plate VII, Fig. 12.

Gen. TIMANA.

Fœm. Corpus gracile. Caput porrigens. Proboscis brevis. Palpi validi, oblique ascendentes; articulus 3^{us} minimus. Antennæ glabræ, graciles. Abdomen subcompressum. Pedes breves, longi, gracillimi; tibiæ posticæ subincrassatæ, quadricalcaratæ. Alæ anticæ latæ, acutæ, margine exteriore subrotundato subobliquo. Alæ posticæ abdomen superantes.

Female. Body slender. Head rather prominent. Proboscis short. Palpi stout, obliquely ascending, not rising so high as the vertex; 3rd joint extremely small. Antennæ smooth, slender. Abdomen slightly compressed, rather shorter than the interior border of the hind wings. Legs long, smooth, very slender; hind tibiæ very slightly incrassated, with four spurs, the 1st pair much longer than the apical pair. Wings broad. Fore wings acute; exterior border slightly rounded and oblique; areolet much less than half the length of the wing.

69. TIMANA COSTALIS. *Fœm.* Lutea; vertice cinereo; fronte ferrugineo conspersa et unifasciata antice alba; pectore ventre que albis; pedibus posticis albidis; alis ferrugineo, conspersis et bifasciatis, fascia 1^{a} postmedia angulata intus diffusa, 2^{a} submarginali interrupta informi, guttis submarginalibus argenteis nigro marginatis; alis anticis fascia ferruginea antemedia recta angusta, vitta costali cinerea, gutta discoidali argentea nigro-marginata; alis posticis puncto discoidali argenteo nigro-marginato.

Female. Luteous. Vertex of the head cinereous; front with ferruginous speckles, and a ferruginous band, its fore part white. Pectus and under side of the abdomen white. Hind legs whitish. Wings with transverse ferruginous speckles, and with two ferruginous bands; 1st band postmedial, forming an acute outward angle in each wing, diffuse on the inner side; 2nd band submarginal, interrupted, and very irregular, accompanied by silvery partly black-bordered dots of various size and shape; under side pale, with the markings much less complete. Fore wings with an antemedial slender straight ferruginous band; a cinereous costal stripe, which is contiguous to a silvery black bordered dot in the disk. Hind wings with a silvery black-bordered discoidal point. Length of the body 7½ lines; of the wings 19 lines. See Plate VII, Fig. 13.

70. **Boarmia abruptaria.** *Mas.* Alba, robusta; capite antico palpisque fuscis, vertice luteo-bifasciato; thorace maculis duabus anticis nigris luteo marginatis duabusque posticis luteis; abdominis segmentis luteo fasciatis; alis fusco conspersis, lineis duabus duplicatis interruptis angulosis guttisque marginalibus fuscis; alis anticis maculis tribus costalibus fuscis; alis posticis margine exteriore subundulato vix angulato.

Male. White, stout. Head in front and palpi dark brown; vertex with two luteous bands. Antennæ black, white at the base, broadly pectinated to two-thirds of the length. Thorax with a black broadly luteous bordered spot on each of the fore tegulæ, and with a luteous spot on each side near the hind border. Abdomen not extending beyond the hind wings, with a luteous band on the hind border of each segment, and with a few black speckles; apical tuft small. Legs stout, mostly blackish. Wings dimly brown-speckled, with two very incomplete double zig-zag brown lines; 1st line antemedial, apparent near the interior border of the hind wings; 2nd postmedial, apparent near the interior border of the fore wings and of the hind wings; some submarginal clusters of speckles, and a row of marginal brown dots. Fore wings acute, with three brown costal spots; exterior border slightly rounded, very oblique. Hind wings with the exterior border slightly festooned, hardly angular. Length of the body 9 lines; of the wings 22 lines.

71. **Tephrosia diffusa.** *Fœm.* Cinereo-viridis, gracilis; palpis

oblique ascendentibus verticem vix superantibus, articulo 3° conico; alis amplis fusco subconspersis, lineis duabus obliquis angulosis fuscis, guttis marginalibus nigricantibus, macula discoidali fasciaque submarginali lata atomaria subtus fuscis; alis anticis apice subrotundatis; alis posticis margine exteriore inciso.

Female. Cinereous green, slender, pale cinereous beneath. Palpi obliquely ascending, hardly rising higher than the vertex; 3rd joint conical, not more than one sixth of the length of the 2nd. Abdomen shorter than the interior border of the hind wings. Wings ample, indistinctly brown-speckled, with two brown zig-zag oblique lines, one antemedial, the other postmedial; marginal dots blackish; under side with a brown discoidal spot (which is largest in the fore wings), and with a broad submarginal band composed of brown speckles. Fore wings slightly rounded at the tips; exterior border rounded very oblique. Hind wings with the exterior border scalloped. Length of the body 6 lines; of the wings 19 lines.

72. ACIDALIA LATIFERA. *Fœm.* Alba; capite palpis thoracisque tegulis anticis cinereis; palpis oblique ascendentibus verticem non superantibus, articulo 3° lineari 2ⁱ dimidio breviore; abdomine rufescente cinereo basi et segmentorum marginibus posticis albis; alis vitta rufescente cinerea antice abbreviata lineam albam undulatam includente, vitta submarginali minus determinata lineam albam angulosam includente, punctis marginalibus nigris.

Female. White, stout. Head, palpi, and fore tegulæ of the thorax cinereous. Palpi obliquely ascending, not rising higher than the vertex; 3rd joint linear, less than half the length of the 2nd. Abdomen reddish cinereous; base and hind borders of the segments white. Legs smooth, slender. Wings with a reddish cinereous stripe, which extends from the middle of the interior border of the hind wings, and is abbreviated near the fore exterior border of the fore wings, and includes on its hind side a white undulating line; a submarginal stripe of the same hue, but less determinate, including a white zig-zag line; marginal points black; under side pale cinereous. Length of the body 3 lines; of the fore wings 9 lines.

Gen. NEBESSA.

Mas. Corpus sat robustum. Proboscis brevis. Palpi erecti, sat validi, verticem non superantes; articulus 3^{us} conicus. Antennæ crebre setosæ. Abdomen alas posticas non superans; sexualia magna. Pedes graciles, longiusculi; tibiæ posticæ dilatatæ; tarsi postici brevissimi. Alæ anticæ latæ, acutæ, margine exteriore vix convexo.

Male. Body rather stout. Proboscis short. Palpi erect, rather stout, not rising higher than the vertex; 3rd joint conical, not more than one-sixth of the length of the 2nd. Antennæ thickly setose. Abdomen not extending beyond the hind wings; tip with lateral valves, and with a large tuft. Legs slender, rather long; hind tibiæ dilated; hind tarsi very short. Wings broad. Fore wings acute; exterior border very slightly rounded, moderately oblique.

73. NEBESSA CHALYBŒATA. *Mas.* Pallidissime cervina; capite, palpis, antennis thoraceque antico nigricantibus; thorace albo; alis fascia antemedia lata obliqua lineisque duabus exterioribus angulosis albido marginatis linea, submarginali pallidiore diffusa indistincta, puncto discoidali nigro; alis anticis fascia apud medium dilatata chalybœo suffusa, linea 1^a exteriore postice nigra.

Male. Very pale fawn colour, testaceous whitish beneath. Head, palpi, antennæ, and fore border of the thorax blackish. Thorax white. Wings with a broad antemedial oblique fawn coloured band, which has darker borders; two exterior zig-zag fawn coloured lines, each of which is bordered with whitish on the outer side; a paler indistinct diffuse submarginal line; marginal festoon brown; a black point in the disk. Fore wings with the band much dilated in the middle on the outer side, partly overspread with chalybeous; hind part of the 1st exterior line black. Length of the body 7½ lines; of the wings 19 lines.

74. SCODIONA CEPHALOTES. *Mas.* Cana, fusco conspersa; palpis porrectis subrostriformibus caput sat superantibus, articulo 3° acuto minimo; thorace margine antico testaceo; tibiis posticis subdilatatis; alis fasciis duabus fascis undulatis, fasciis duabus exterioribus pallidioribus angulosis, fimbria alba, subtus flavis nigrofusco bifasciatis; alis anticis fascia intermedia fusca undulata, fasciis subtus duabus intermediis nigris.

Male. Hoary, speckled with brown. Body whitish beneath. Palpi porrect, subrostriform, extending somewhat beyond the head; 3rd joint acute, very minute. Antennæ minutely setulose. Thorax with a testaceous fore border. Abdomen rather shorter than the interior border of the hind wings; apical tuft small. Legs smooth, slender; hind tibiæ slightly dilated. Wings with two undulating brown bands, and with two exterior paler brown zig-zag bands; fringe white; under side yellow, with an antemedial band and a broad marginal band, both blackish brown. Fore wings with an intermediate undulating brown band; under side with two black bands between the antemedial band and the marginal band, with which latter they are connected at the hind end. Length of the body 6 lines; of the fore wings 16 lines. See Plate VII, Fig. 14.

75. MICRONIA TENELLA. *Mas.* Alba; capite anticio nigricante; antennis fulvis robustis; alis testaceo pallido transverse strigatis; alis posticis margine exteriore rectangulato.

Male. White, slender. Front of the head blackish. Antennæ tawny, stout, smooth. Abdomen shorter than the interior border of the hind wings. Legs short, smooth, rather stout. Wings transversely and indistinctly streaked with pale testaceous. Fore wings acute; costa and exterior border slightly rounded, the latter slightly oblique. Hind wings with the exterior border rectangular in the middle. Length of the body 4 lines; of the wings 14 lines.

76. SUBRITA LUCTUOSA. *Mas.* Obscure cinerea, subtus albida; palpis erectis verticem longe superantibus articulo 3° lanceolato; abdomine alas posticas longe superante; alis anticis albo subconspersis apice rotundatis, lineis quatuor nigricantibus transversis undulatis 3^a valde arcuata albo marginata 4^a subangulosa, punctis marginalibus nigris.

Male. Dark cinereous. Body whitish beneath. Palpi erect, rather slender, rising much higher than the vertex; 3rd joint lanceolate, a little shorter than the 2nd. Antennæ smooth, rather stout. Abdomen cinereous, extending much beyond the hind wings; apical tuft small. Legs whitish, smooth. Fore wings rounded at the tips, with some white speckles, and with four blackish undulating transverse lines; 1st line very near the base; 2nd antemedial, accompanied by a white line; 3rd postmedial, much curved outward, slightly bordered with white on the outer side; 4th slightly zig-zag; marginal points black; exterior border rounded, not oblique; under side whitish along the interior border. Hind wings whitish along the costa. Length of the body 3 lines; of the wings 8 lines.

MAY 25TH, 1869.

Professor John Young, M.D., Vice-President, in the chair.

SPECIMENS EXHIBITED.

Dr Young exhibited specimens of *Eurypterus Scouleri* (Hibbert), obtained from the lower carboniferous strata near Dunse, and presented to the Hunterian Museum by Mr William Stevenson of that town. This is the second specimen exhibited in Glasgow, the first—the type specimen—being deposited in the Andersonian Museum. After pointing out the specific character, Dr Young said he would defer more detailed observations on the fossil, as Mr Young had informed him that further examples were to be sent. Dr Young also exhibited a very fine example of the Australian spiny lizard (*Moloch horridus*, Gray), presented to the Hunterian Museum by Mr Kirsop, Argyle Street.

Mr Gray exhibited three specimens of the Great-Spotted Woodpecker (*Picus major*), male, female, and young bird of the first year, from Forfarshire and Banffshire. For two of the specimens he expressed himself indebted to Mr James Murison, station master, Tillynaught Junction, by whom they had been shot in that neighbourhood a few weeks previously. Mr Gray also exhibited a specimen of Leach's Petrel (*Thalassidroma Leachii*), which had been captured near the Loch of Forfar a few months ago.

The Secretary exhibited a small collection of zoophytes and shells from Banffshire and Ayrshire, forwarded by Messrs John Macdonald, Buckie, and Thomas Anderson, Girvan, corresponding members. Two of the characteristic shells of the Buckie coast were *Pinna ingens* and *Fusus corneus;* and among the zoophytes from Girvan there were several large specimens of *Pennatula* *phosphorea*, regarding which Mr Gray remarked that they were of extreme size when compared with specimens taken off the Dunbar coast, and were besides much lighter in colour. Examples of this zoophyte from the east of Scotland were, as a rule, much smaller, and of a deeper red, than those of the west coast, and it might be of importance to ascertain if they were not two species. He had examined in one day as many as seven or eight hundred of the smaller kind, brought on shore by the Dunbar fishermen.

Mr John Young exhibited a specimen of *Calamites nodosus* from the Springhill pits, Baillieston, showing the nodes to which the lateral fronds were attached; also a fine lateral frond of the same plant from Craigneuk pit, near Motherwell, presented to the Hunterian Museum by Mr David Wingate. Mr Young remarked that this was the first frond of this plant which he had yet seen from the Scottish coalfield. He pointed out its relation to the stem, and wherein it differed from other species of the genus *Calamites.*

Mr Young also exhibited a mounted series of small fossil organisms, which he had obtained from a travelled boulder of limestone embedded in the boulder clay at Gilmorehill. This limestone, he stated, agreed in mineral composition, and in the character of its fossils, with the bed of limestone which underlies the coal of the Campsie district, locally known as the "white limestone." The outer surface of the boulder had become partially rotted from lying so long in the till, and so abundant were the organisms in the stone, that from a small quantity of the rotted material, scraped from the face of the boulder, he had obtained several thousand specimens of *Entomostraca,* and a small spiral annelide, all in a good state of preservation. The *Entomostraca* were all of species that had recently been determined by Professor Rupert Jones and Mr J. W. Kirby as new to science, and were named as follows:—*Cythere fabulina,* a large variety, *C. pungens*, *C. secans,* and *C. subula.* The annelide, *Spirorbis carbonarius,* is a well known species, but seldom found in such good preservation as in the present instance. Mr Young stated that the foregoing organisms, along with one or two other species of *Cythere,* characterise, in a measure, all the so-called fresh water or estuarine strata of the Lanarkshire coalfield, several of the species being found to range from the bottom to the top of the system; and although the beds in which they occur often alternate with marine strata, he had never found these species mixed up with the organisms of the marine beds, hence he inferred that they had lived under different conditions.

Mr James E. Somerville exhibited specimens of *Euplectella aspergillum*, Owen, popularly known as Venus' Flower Basket. These beautiful organisms, of which Mr Somerville had no fewer than seven on the table for the inspection of the members, attracted great attention. This remarkable sponge was discovered upwards of thirty years ago, and was then so rare that a pair of them sold for as much as £200. Even two or three years ago, a single specimen brought thirty guineas. Mr Somerville called attention to the wonderful regularity in the disposition of the fibres composing the structure. The fibres, which are nothing more than very elongated sponge spicules, are bound together in fascicles. These, varying in number from thirty to sixty, arise from the base or narrower portion of the cylinder, and, diverging very gently, proceed to the upper or free extremity. The longitudinal fascicles are crossed by two series of less regular oblique fibres, which, both above and below, embrace the longitudinal ones, and proceed in a spiral manner in opposite directions to the top. Strength is further given to the skeleton by a succession of hoops or rings, placed at regular intervals, on the inner side of the structure, and at right angles to the longitudinal fibres. The result of the whole is a beautiful cornucopia of glass, presenting a lace-like surface, with spaces alternately open and closed. In addition to all this, from the two sides of each bundle of oblique fibres, two plates of short upright fibres arise, which meet, and are held together by others which interlace, and thus sharp ridges are formed, which, with their elegant wavy spirals, decorate the exterior of the cylinder. The remote extremity is closed by a lid or net work of strong fibres, with upright projections at the intersections. This lid is separated from the cylinder by a broad frill or circular ridge. The absence of the wavy crests and circular frill, among other things, serves to distinguish the only other known *Euplectella*, viz., *cucumer*, a species obtained among the Seychelle Islands. The structure of the organism (which is simply the skeleton, the whole being covered in the living state by sarcode) may be seen by tracing the fascicles to the base, where they resolve themselves into their composing fibres. These, along with other free fibres, form a mass of loose, felt-like material, in which are embedded portions of shells, corals, and stones. The last two or three inches of each fibre, when examined closely, are found to be armed with a large number of teeth, or thorny projections, while the extremity is equipped with four or five small hooks, arranged in the form of a grapnel. By this means the sponge anchors itself to the place of its attachment. Mr Somerville adverted to the fact of nearly every specimen of *Euplectella* containing one or more small crabs, frequently of different species. These had been foolishly supposed by some to have caused, by their running up and down the tube, the curvature at the base which all the specimens of *Euplectella* possess more or less. The crabs probably entered before the enclosing lid was added, for that seems the latest part to be formed; or else, by entering as fry through the openings in the walls of the cylinder, and living on the food brought in by the circulating currents, they attained their mature state.

Two of the specimens on the table exhibited remarkable malformations. The one departed considerably from the ordinary symmetrical form, being bulged out in several parts. The other had been fractured while alive, and had been mended by the animal itself. In it the ordinary gentle curve of the *Euplectella* was broken, and the repair marked by an angle. Mr Somerville stated that he was indebted to a lady in Glasgow for the opportunity of exhibiting the specimens. They had been collected in deep water off the island of Zebu in the Philippine group, and sent to this country by James Fyfe, Esq. of Ilo Ilo.

Dr James Stirton exhibited specimens of *Dicranum arcticum* from Ben Lawers, and made a few remarks on the species.

At the close of the proceedings, the Secretary (Mr Gray) handed over to Professor Young, as keeper of the Hunterian Museum, several rare birds and other objects not previously in the collection, remarking that it afforded him much gratification to observe the very great care with which all donations to that institution are preserved. Dr Young accepted the donation, and stated that he had been directed by the Senate of the University to convey to Mr Gray their thanks for the interest he had taken in the Museum, and for the important additions he had made in various departments.

After a few remarks from Professor Young on the satisfactory progress made by the Society during the past year, the Session was declared to be closed.

ADDENDUM.

The following abstract of Mr Somerville's remarks on Terrestrial and Fluviatile Mollusca from Egypt and Palestine refers to specimens exhibited by that gentleman at the meeting held on November 24th, 1868, page 237:—

Mr Somerville exhibited a small collection of land and fresh-water shells, made by himself during a recent tour in Egypt and Palestine. He remarked that the soft, muddy banks of the Nile were eminently suitable for *Unionidæ*, but by no means so for *Gasteropoda*. The former, however, seemed to be held in check by the rise and fall of the river. Specimens of *Unio pictorum*, *Unio Nilotica*, and *Unio Ægyptiaca* (Caill), from the Nile in Upper Egypt were shown. Near Esneh a number of *Cyrena fluviatilis* (Müll.) were obtained, exhibiting some interesting varieties. At the First Cataracts, on the confines of Egypt and Nubia, *Paludina bulimoides* (Lam.) was very abundant, along with a small species of *Melania*. The Berber children are accustomed to string these into necklaces for sale to travellers. The rocky sides and bed of the river at that part, consisting, as they do, of red syenite (whence were quarried materials for the obelisks, statues, and temples of the ancient Egyptians), afford a firm and clean surface for such *Gasteropods.*

In the neighbourhood of the pyramids specimens of *Paludina Nilotica* were met with, a species closely resembling a *Cyclostoma.* They had probably been transported from the dried-up pools to the desert by the wind.

Throughout the valley of the Nile *Helicidæ* are very scarce. The annual submergence of the country, and the universality of cultivation wherever the soil is moistened, may account for their paucity. *Bulimus decollatus* was the only one observed. But in going out to the desert, one is amazed at the exuberance of snail life. The scanty vegetation there met with is attacked by hosts of *Helices.* At one of the stations on the railway between Cairo and Suez, a few hundred yards from the station house, where there seemed at first to be nothing but dry, rounded flints, *Helix maculosa* (Born.) occurred in profusion. Specimens of *H. Arabica* were also shown, collected by Rev. A. N. Somerville in the desert near Sinai (1849).

On reaching Palestine, the traveller finds himself in a country differing in almost every respect from Egypt. There the soil, climate, and vegetation, luxuriant and varied, are eminently suited for the development of terrestrial mollusca.

In the southern portion of the country, about Jerusalem and Hebron, the elegant *Helix spiriplana* (Olivier) is abundant, along with *H. melanostoma*, *H. candidissima*, *H. virgata*, and *H. cæsareana* (Pam.) At the pools of Solomon, between Bethlehem and Hebron, *Zonites Jebusitica* (Roth.), *Chondrus ovularis* (Lam.), *Bulimus Sidoniensis* (Charp.) occurred beneath stones. On the dry hill-sides of Judæa, *Helix Arabica* (Roth.) is common, while the scraggy and usually aromatic vegetation of these districts is absolutely covered with *Helix Syriacus* (Ehr.), and with its near ally *H. Olivieri* (Fer).

The district around the base of Hermon (Jebel es Sheikh) is well watered, and has abundance of natural wood, mollusca are consequently plentiful. The large *Bulimus labrosus* (Olivier) was very common, and in crannies where it had hybernated, might be gathered in dozens. Along with it were *Bulimus carneus* (Pfr.), *B. Syriacus* (Pfr.), *B. Sidoniensis* (Charp). Large specimens of *Helix pomatia* (Lin.) were also common, as well as the pyramidal *Helix elegans* (Drap.), and the curious flattened *Helix cariosa* (Olivier), with its eroded surface and large umbilicus.

The streams and fountains of Palestine abound with mollusca. In nearly all the springs, whether of sweet or brackish, cold or warm water, *Melanopsis praerosa* and *Neritina Michonii* (both of which have a black, smooth, and glossy epidermis) are to be met with in profusion. Their development, however, was noticeably affected by the character of the water. Thus, in the very cold waters at the source of the Abana or Barada, near Damascus, they were quite diminutive. At the sources of the Jordan, both at Dan, Tel el Kady, and at Cæsarea Philippi, Banias, they were somewhat larger. In the sweet but tepid waters (72°) of the fountain of Elisha (Ain es Sultan), at Jericho, they were considerably more bulky; while in the hot and saline waters of the streams at Ain et Tabigha, supposed to be Bethsaida, they attained their largest development. Both species seem liable to erosion of the spire, and that apparently whether in sweet or brackish water.

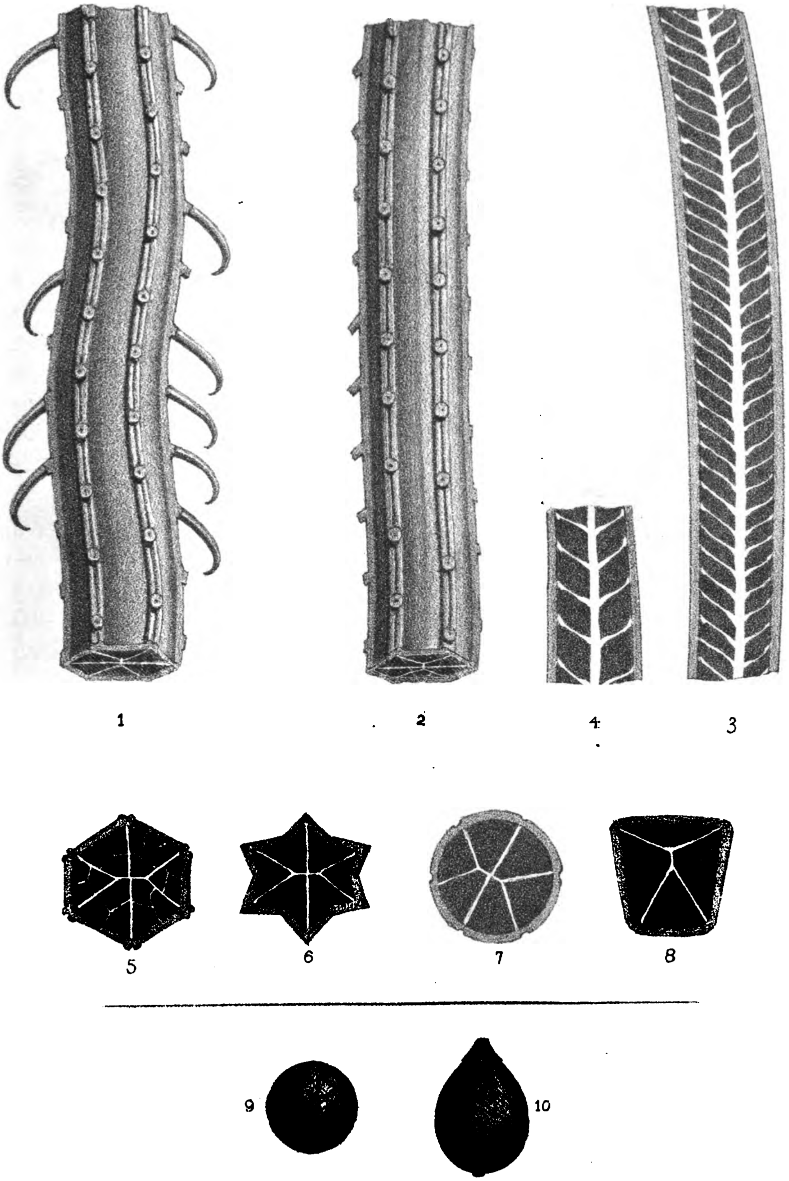
The two mollusca just mentioned seem confined to running water. When the still waters of the lakes of Merom and Tiberias are visited, their places are found to be taken by two other species, *Melanopsis costata*, a shell with numerous varices, and banded with purple and white; and *Neritina Jordani* (Buttl.), a little dumpy, but beautifully variegated shell, with streaks of black, white, and rose. These two species appear to be confined to the upper waters of the Jordan Valley, where they occur in such profusion as to form a considerable portion of the beach of the Sea of Galilee. In the same waters occurred sparingly *Cyrena Cor* (Lam.) (Rev. A. N. Somerville, 1849).

At the fountain of Jezreel (Ain Jalud) (1 Sam. xxix. 1), which bursts out from a grotto overhung with *Adiantum capillus Veneris*, at the base of Mount Gilboa, another species of *Melanopsis*, viz., *Saulcyi* (Bourg.) occurs, intermediate between the two above mentioned, the apical portion exhibiting varices similar to those in *M. costata*, while the basal portion is smooth as in *M. praerosa*. This species was also met with at Ain es Sultan (Jericho), where *Melania tuberculata* was likewise collected.

At Nahr el Kelb, near Beyrut, one of the streams from Lebanon, where are seen the remarkable tablets cut on the face of the rocks by the ancient Assyrian and Egyptian monarchs, and later by Marcus Aurelius, several species were obtained. On the surface of the tablets were hundreds of the fine *Clausilia Boissieri* (Charp.), which hung with their apices pointing downwards in a singular manner. Along with it occurred *Cyclostoma elegans* and *Helix nummus* (Ehr.) The latter resembles, and seems to take the place of our own *Helix lapicida*.

At Rhodes, on the ruins of the castle of the Knights of St John, were found *Bulimus faux-nigrum*, and on the castle of Smyrna *Clausilia corrugata* (Fer.) The ruined theatre of ancient Ephesus (see Acts xix. 29) yielded *Bulimus decollatus*. And during a few minutes on shore at Larnaca, Cyprus, *Helix pisana* and *H. vermicularis* were collected.

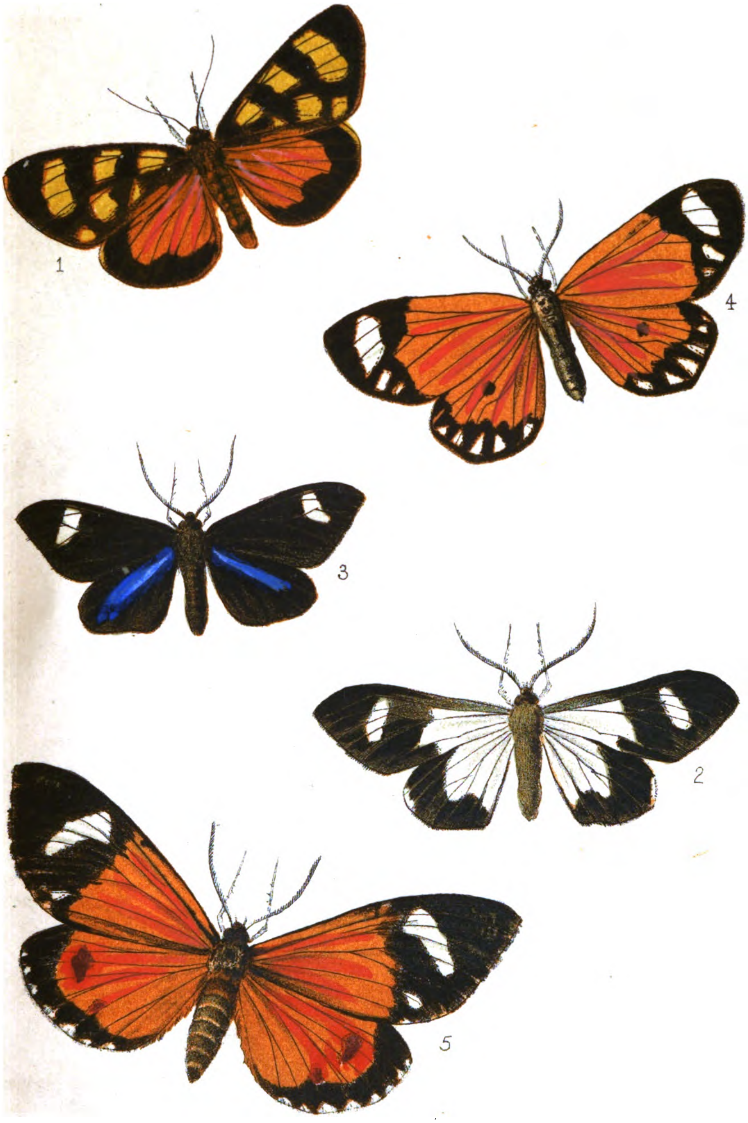
Mr Somerville expressed his obligation to T. Gray, Esq., and the Rev. Dr Tristram, for assistance in identifying the species.



CARBONIFEROUS FOSSILS

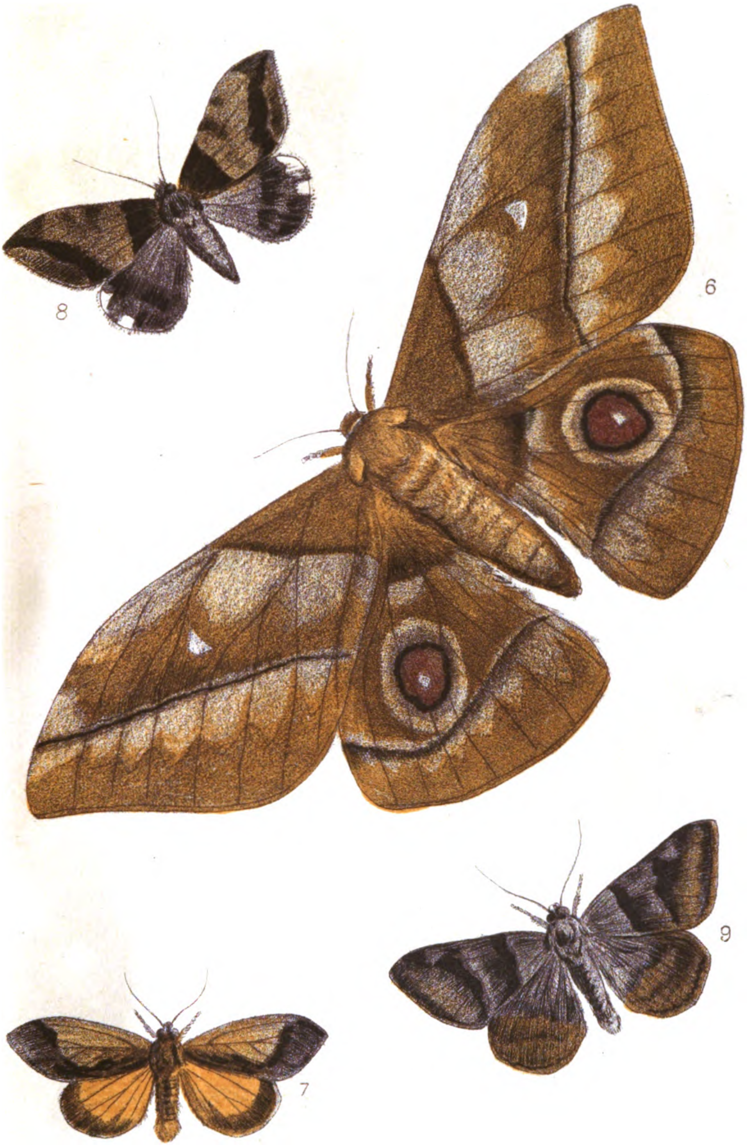
HETEROPHYLLIA MIRABILIS & TRIGONOCARPUM?

J Young, Direxit.
Frank Bott. Lith.

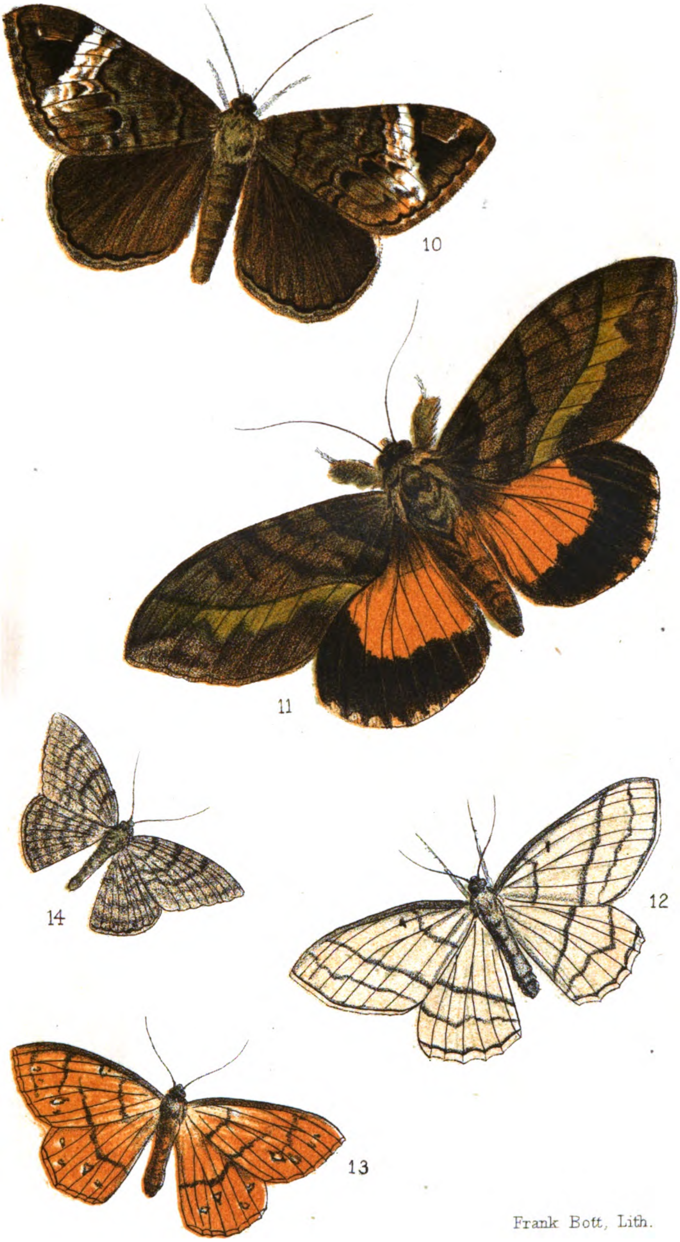


Frank Bott, Lith.

1. EUSEMIA PARDALINA. ... 3. LEUCOPSUMIS CRYPTOCHROMA.
2. NYCTEMERA DECISA. 4. ALETIS POSTICA.
5. PHÆGONISTA SIMILIS.



6. ANTHERÆA INTERMISCENS. 8. ACHÆA PARTITA.
7. TUERTA CHRYSOCHLORA. 9. OPHIUSA SUBÆNESCENS.



Frank Bott, Lith.

10. TOLNA VERSICOLOR. 12. TRAINA STRAMINATA.
11. OPHIDERES DIVITIOSA. 13. TIMANA COSTALIS.
14. SCODIONA CEPHALOTES.

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